FACTORY

MANAGEMENT AND MAINTENANCE

JUNE 1958

A McGRAW-HILL PUBLICATION · ONE DOLLAR

55 TIMELY AIDS ON COSTS:

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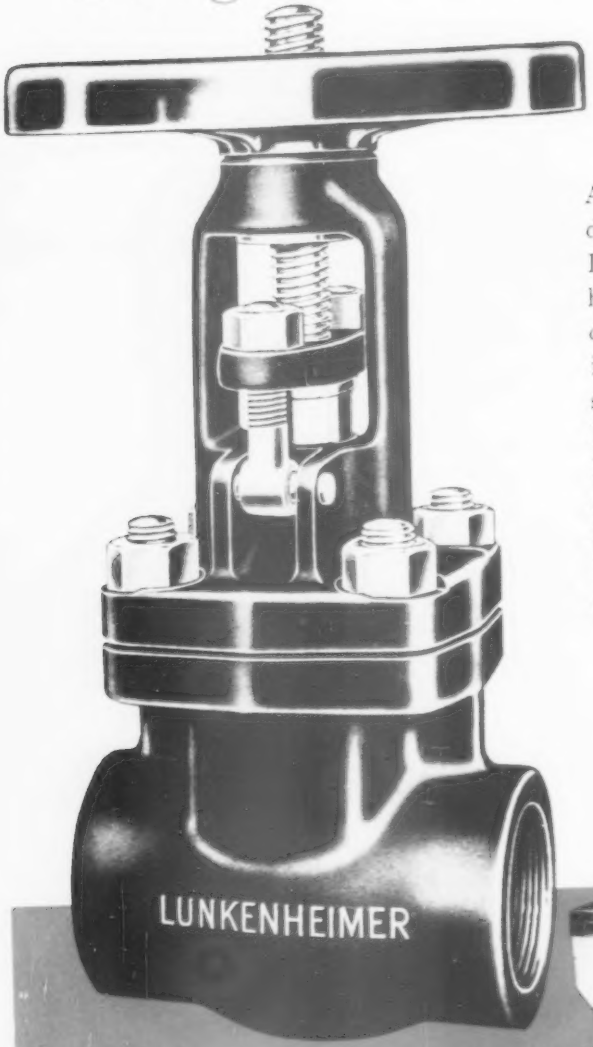
THE MAGAZINE OF PLANT OPERATING MANAGEMENT

NOW! AN ALL-NEW

Forged Steel Gate Valve

by LUNKENHEIMER



Another addition to the world famous line. In design, materials, and workmanship, this new Forged Steel Valve offers traditional Lunkenheimer performance to cut your maintenance costs to rock bottom. It's compact to fit cramped installation areas, without excess weight—yet safely handles high pressures and temperatures. Discs are 500 Brinell 13 Chrome Stainless Steel. Precision machined guides keep the disc from dragging across seat rings. Hardened 13 Chrome Stainless seat rings are rolled-in—never loosen in service. A two-piece gland of ball-and-socket design prevents binding in stuffing box.

See your Lunkenheimer Distributor, or write The Lunkenheimer Company, Cincinnati 14, Ohio, for literature.

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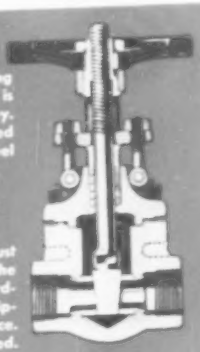
A strong torque transmitting connection to yoke bushing is provided by a handwheel key. All parts easily dismantled and reassembled. Handwheel nut securely locked in place.



LUNKENHEIMER QUALITY

Fig. 8001

OUTSIDE SCREW AND YOKE—BOLTED BONNET

800 lbs. 850 F—2000 lbs. 100 F
Fig. 8001—Screw Ends, Sizes ½"—2"
Fig. 8002—Socket Welding, Sizes ½"—2".

UNIFORM SEAT-DISC HARDNESS

Discs are 500 Brinell—not just on wearing surfaces but all the way through. Uniform hardness eliminates danger of chipping or cracking in service. Seat Rings are also hardened.

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B.F.Goodrich

Shaking rubber keeps coal on the run

B. F. Goodrich improvements in rubber brought extra savings

Problem: At this power plant, coal stored in silos was sent on its way to furnaces through metal pipes. But when the coal was wet, it stuck together, became clogged in the pipes. Coal delivery to the furnace was delayed while workers pounded the pipes clear with sledge hammers.

What was done: A company engineer came up with a unique solution to the problem. The metal pipe was replaced with a rubber hose specially developed by B.F.Goodrich to handle rough materials. A vibrator was attached to the hose to keep the coal flowing freely.

Savings: The B.F.Goodrich rubber hose was tried. That was one year ago, and there has not been one delay because of clogging since.

Extra benefits: The constant wear of coal sliding down the metal pipes wore them out in about one year. But after one year of service, the B.F.Goodrich hose is still going strong, shows no sign of wear. No holes, no repairs, no problems of any kind. That's because the lining of this hose is made with Armorite, the toughest, wear-resistant rubber known. This rubber is so tough that, on many jobs, it outlasts the hardest steel 10 to 1.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-365, Akron 18, Ohio.*

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67TH YEAR OF PUBLICATION

June 1958 Vol. 116, No. 6

Published monthly by McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 36, N.Y. Second-class mail privileges authorized at New York, N.Y. Subscription, $4 a year in U.S.A. For further details, see p. 8.

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THE MAGAZINE OF PLANT OPERATING MANAGEMENT

Edited exclusively for the men with management responsibility for production and maintenance in the manufacturing industries

PROBLEM-SOLVING GUIDE

THIS SIMPLE FILING SYSTEM is designed to give quick access to past FACTORY articles that can help you solve current operating problems. Here's how it works:

1. All major articles and many short items are classified according to a functional code system (below). Codes cover basic operating responsibilities.

2. Where applicable, articles are also coded (see numbers in parentheses) to show secondary or closely related topics.

3. To use, cut up the items below. Paste them on 3x5-in. cards and file by code number. To cross-index, copy the information on a second card, and file by secondary code.

Note: For suggestions on using this new tool (plus an outline for a more complete decimal filing system), see FACTORY, February 1957, page 104.

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Save $1,200 Per Truck Per Year

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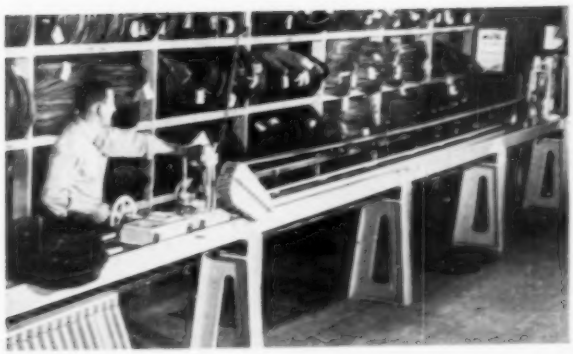

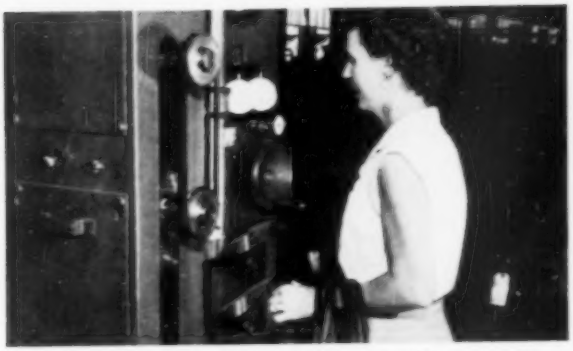

Precise measurement of every Goodyear V-Belt and coding to unusually fine tolerances prepare the way for more exact matching of sets—at factory, warehouse, or by distributors. The built-in quality of Dimensional Stability assures that belts stay matched, for life.

dimensional stability – Unsurpassed steel cables or exclusive Triple-Tempered (3-T) Cords provide true dimensional stability from factory to drive.

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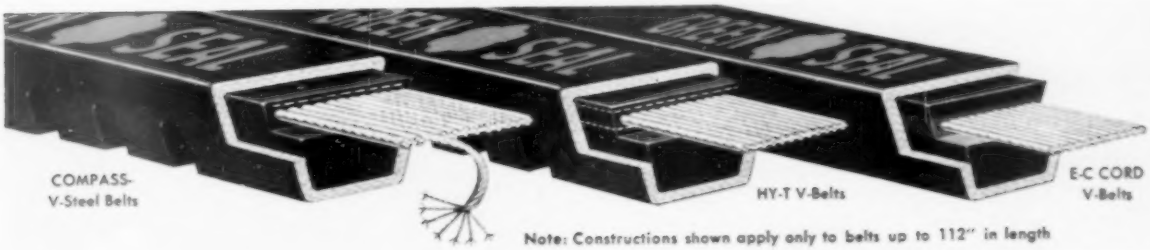

Note: Constructions shown apply only to belts up to 112" in length

Watch "Goodyear Theater" on TV—every other Monday, 9:30 P. M., E. D. T.

Compass, E-C Cord, Hy-T, Green Seal—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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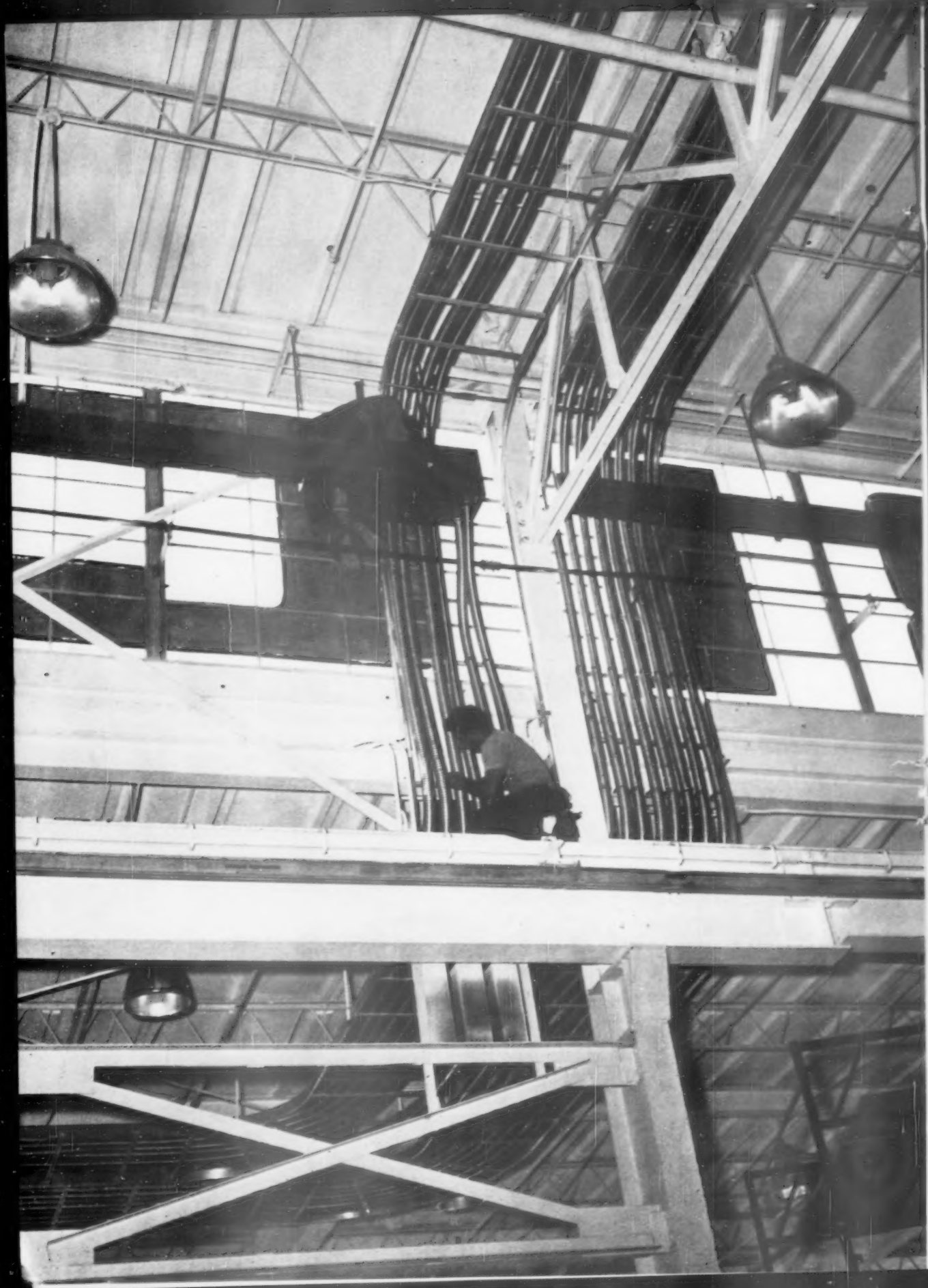

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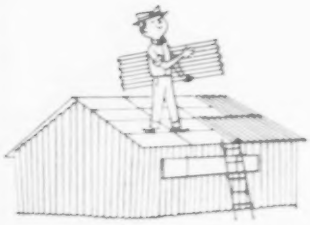

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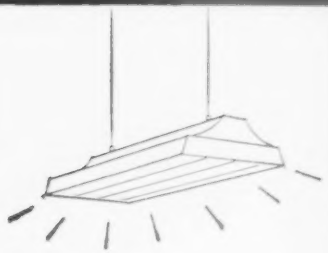

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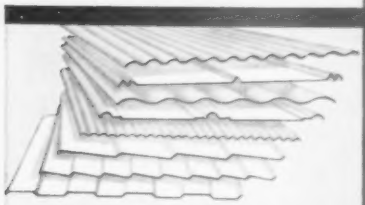

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FACTORY LETTERS

LAUREL FOR AN AUTHOR

Sir:

Mr. William W. Taylor of Uhling, Taylor and Associates, Cincinnati management consultants, is in Denmark as a guest of the Danish Meat Packers Research Institute.

I thought you'd be interested to know that Mr. Taylor became known to the Danish Institute when he wrote an article, "New Look at Methods Incentives," which appeared in the August 1955 issue of FACTORY. Mr. Boerge Fleischer, head of the Institute, wrote Mr. Taylor that the article suggested answers to problems general to the Danish meat packing industry and that they wished to have him come to their country to work with them.

Leonard M. Sive
Sive & Associates
712 Broadway, Cincinnati 2

MORE ABOUT TOOLCRIBS

Sir:

As author of the book "Better Tool Cribs," I was quite interested in the article "Now—Toolcribs Go Self-Service" that appeared in the February 1958 issue of FACTORY (p. 92).

While there are certain advantages to be gained from the use of self-service systems in organizations of the type and size of the Naval Shipyard at Pearl Harbor, there are an equal number of disadvantages

Turn the page

FACTORY MANAGEMENT AND MAINTENANCE
JUNE 1958 Vol. 116, No. 6

A consolidation of Factory and Industrial Management including Factory and Maintenance Engineering. Published monthly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), Founder.

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United States subscription rate for individuals in the field of the publication, $4 per year; foreign rate, $25 per year. Single copies in U.S.A., $1.

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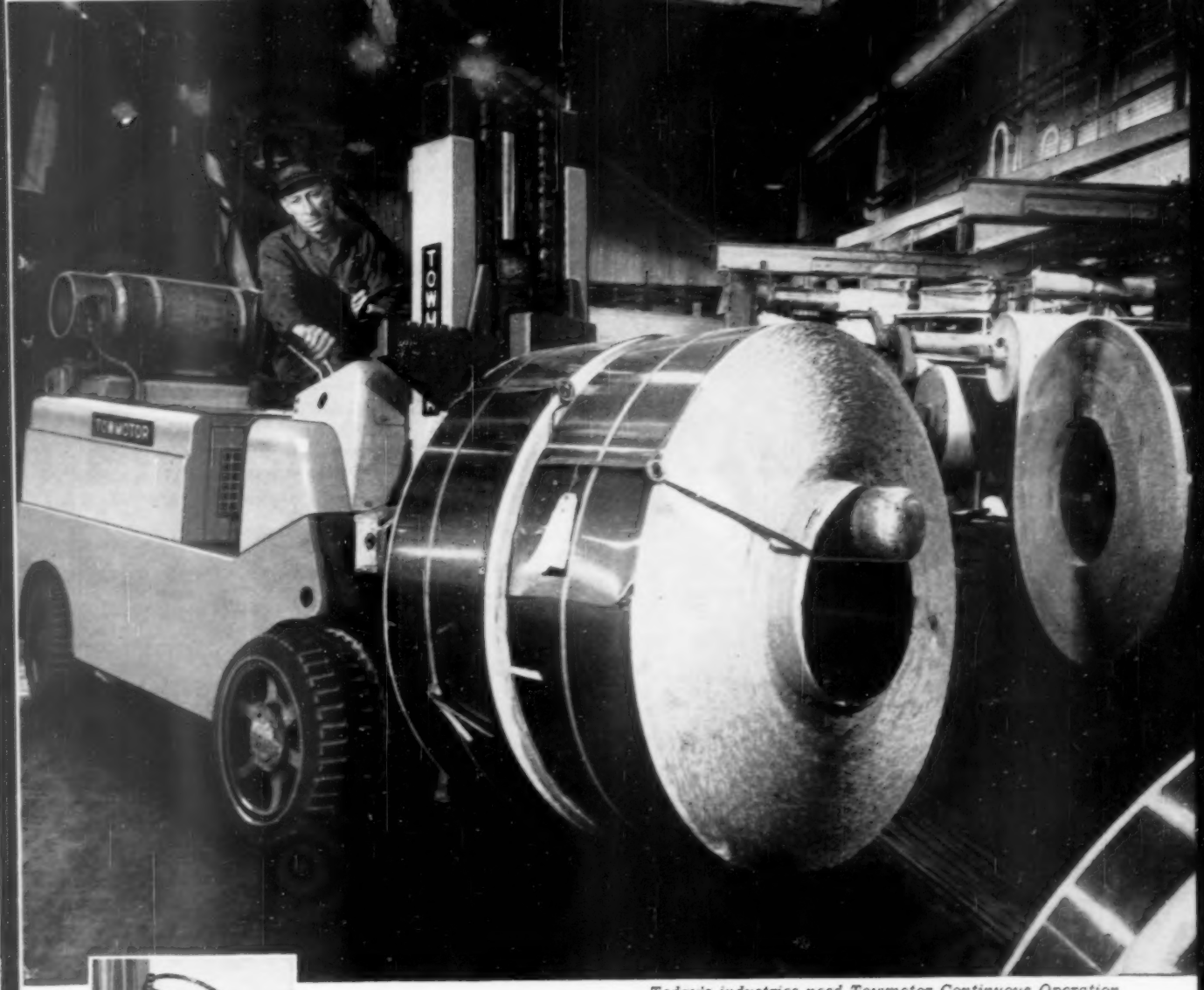

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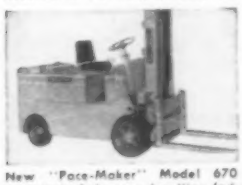

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NEW MAINTENANCE MANUAL—another example of Champion LIGHTmanship, an attitude and aptitude that makes sure you get all the light you pay for. Many useful, cost-saving hints have been added in this new edition of the popular guide that has proved to be of great practical value to lighting men everywhere. Copies available on your letterhead request.

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ONE PLANT standard of quality control

CHAMPION LAMP WORKS
Lynn, Massachusetts
A division of Consolidated Electric Lamp Co.

CHAMPION *Lamps*
Incandescent Fluorescent
Your best buy in lamps

FACTORY / LETTERS

Begins on page 8

when such systems are installed in small and medium-size shops outside of government installations. For example, the greater the diversity of operations carried out in a plant, the greater the need for experienced and skilled toolcrib attendants, a fact contrary to the viewpoint in the article. Furthermore, what provision can be made for the storing and distribution of jigs and fixtures associated with a particular job? Regarding straightening out rummaged bins, and seeing that tools are in good condition, this situation rarely arises with systems other than the self-service type.

These are only a few of the points that should be considered before adopting a self-service system.

William Raisglid
53-08 39th Ave.
Woodside 77, N. Y.

► The February article didn't suggest that self-service is a panacea for toolcrib problems. But our editors feel that the technique has far broader applicability than reader Raisglid seems to suggest. Have any other of our readers had experience with self-service toolcribs? We'd like to hear from you—ED.

INFORMATION WANTED

Sir:

We are hoping to standardize on a 42x42 pallet (no overhang) in our materials handling of corrugated cases. Is there available a sliderule or chart which would enable us to easily ascertain proper case sizes and pallet patterns?

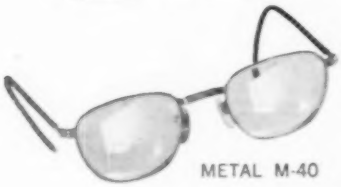
E. F. Foley
Purchasing Agent
F. N. Burt Co., Inc.
500 Seneca St., Buffalo 4

► We're sending a reprint of the Case Book section of our January 1958 issue to Mr. Foley. On p. 84 is an item describing a palletization sliderule developed by the U. S. Navy, and made for it by Whitehead & Hoag Co., 272 Sussex Ave., Newark, N. J. Although this sliderule is for a 40x48 pallet, Whitehead & Hoag may be able to produce one for a 42x42 pallet. Also, there is a

You get so much **MORE** out of B&L **PROTECTION-PLUS** Safety Glasses!

ACETATE Y-60

COMBINATION Y-90



METAL M-40

On man and woman at top, T-60 Two-Tone Frames.

+ **PROTECTION** • Frames unsurpassed in strength and durability. Bal-SAFE lenses . . . [illegible] or prescription . . . give *maximum impact resistance.*

+ **ECONOMY** • Exclusive "integrated" design of line (interchangeable parts and accessories) means smaller inventory. Frame life expectancy is demonstrably greater.

+ **WORKER ACCEPTANCE** • Products of nation's top ophthalmic specialists . . . expert in modern eyewear development . . . styling and comfort.

When you standardize throughout your plants on Bausch & Lomb Safety Eyewear, you're in the best possible position to demonstrate . . . to workers AND management . . . the wisdom of your choice.

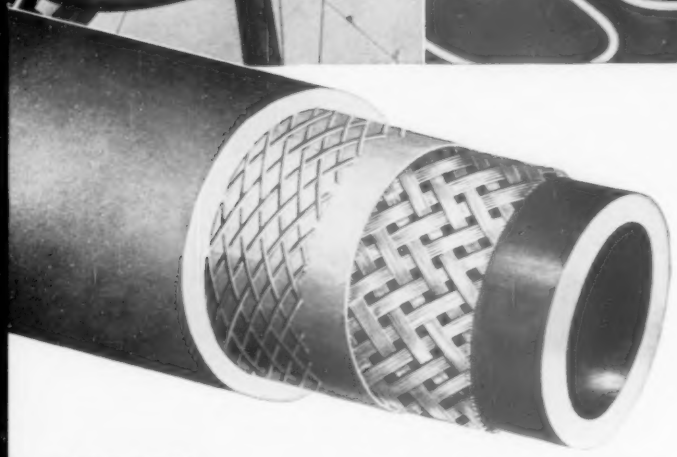
You get maximum protection *plus* economy *plus* your workers' hearty OK. Want to be "filled in" on the latest in this line? Call the Bausch & Lomb supplier in your area, or write: Bausch & Lomb Optical Co., 90130 Smith Street, Rochester 2, New York.

BAUSCH & LOMB

SINCE 1853

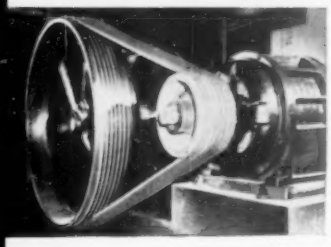
For more facts circle 456 on Reader Service Card

There's a Thermoid Hose for every job



Cut costs with Thermoid Conveyor Belting...

...and Thermoid Multi-V Belts.



And for your job, too!

You'll find Thermoid has a hose that wears better, lasts longer, stays "on the job" to save you time and money. Each Thermoid Hose is built to do a specific job *best*. The same is true of Thermoid Conveyor Belting, Multi-V Belts and Friction Materials. Call your local Thermoid Distributor today.

Thermoid

Thermoid Company
Trenton, New Jersey • Nephi, Utah

For more facts circle 457 on Reader Service Card

Begins on page 8

book on pallet patterns: "The Palletizer," by Saul Goldweitz, published by Materials Handling Laboratories, 795 Boyleston St., Boston—ED.

Sir:

I am interested in learning more about Powder-Cutting of Concrete, developed by the Linde Co., referred to in an article in the February issue of FACTORY (p. 116).

Robert H. Easley
Field Engineer
Columbia-Southern Chemical Corp.
P.O. Box 4026, Corpus Christi, Tex.

► **Contact Mr. A. J. Bajart, Linde Co., Division of Union Carbide Corp., 420 Lexington Ave., New York 17—ED.**

Sir:

We are contemplating a work sampling survey of our maintenance labor and are searching for information on "work sampling" procedure.

R. S. Wilde
Hercules Powder Co., Inc.
Huron Milling Division
Harbor Beach, Mich.

► **Reprints of the July 1952 "Work Sampling" are still available. We suggest also "Work Measurement in Maintenance" from our January 1955 issue. Each is 50¢. Write to Reader Service Dept., FACTORY, 330 West 42nd St., New York 36. Two fine books on "Work Sampling" have been published recently: "Work Sampling" by Heiland and Richardson (McGraw-Hill Book Co., 330 West 42nd St., New York 36, $6), and "Work Sampling" by Ralph Barnes (John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, $7.95)—ED.**

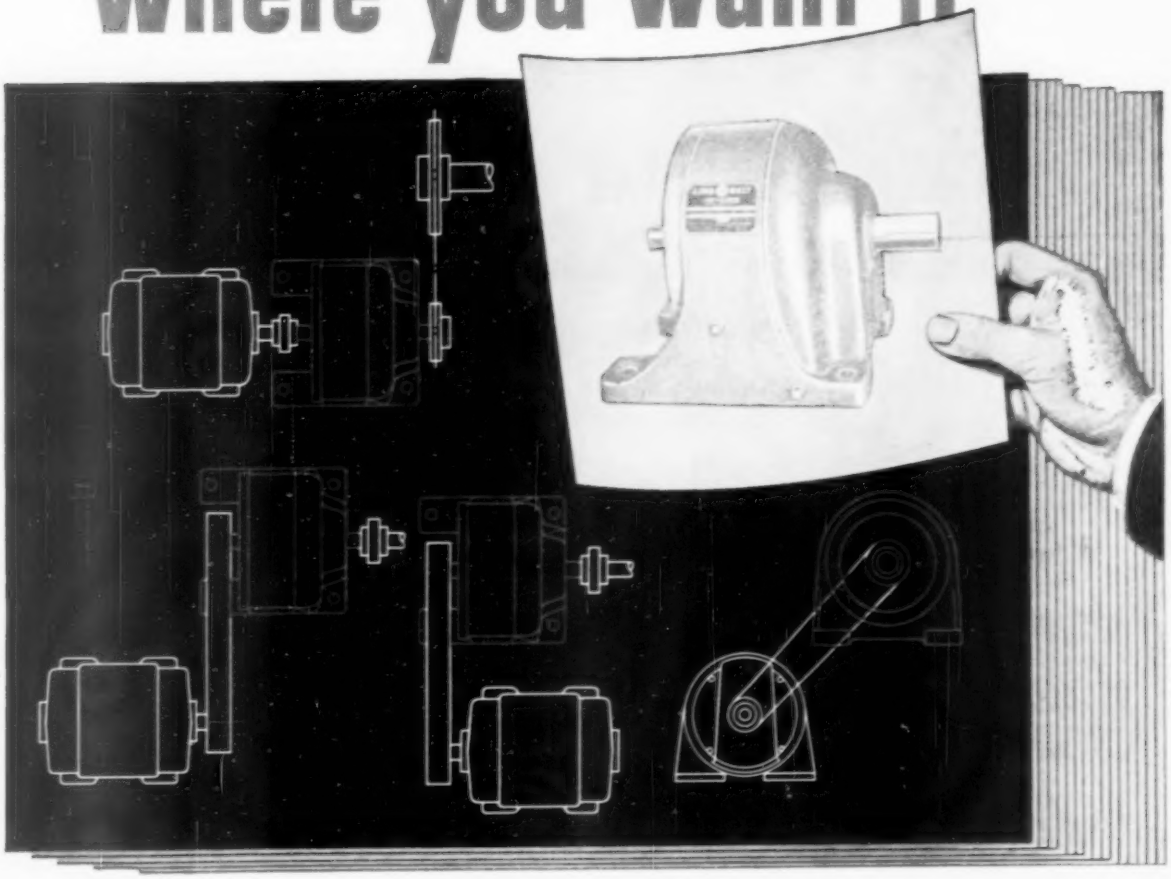
MAINTENANCE INCENTIVES

Sir:

We would like to know what, if any, articles you have published concerning an incentive plan for maintenance work on packaging machinery, or other light machinery. Our problem concerns a plant, one of whose major operations is the packaging of small items. The girls

Here's a SPEED REDUCER that lets you

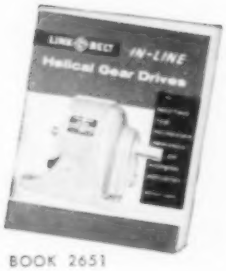
mount the motor where you want it



Versatile **LINK-BELT** *In-Line helical gear drives give wide latitude in drive arrangement*

Make the most of mounting space with quiet, cool-running, oil-tight Link-Belt In-Line helical gear drives. No need to direct-connect the motor. Where layout requirements so dictate—or to achieve even higher reduction at low cost—a chain or gear drive can be used in between. Location of input and output shafts on same planes make installation easy, saves space.

Consists of a streamlined housing with double, triple or quadruple reductions up to 206 hp. Call your authorized Link-Belt stock-carrying distributor or nearby Link-Belt office. Ask for Book 2651.



BOOK 2651

LINK-BELT

SPEED REDUCERS

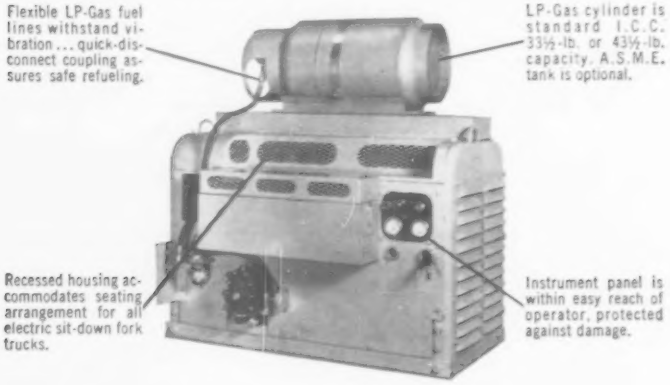
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,008

For more facts circle 458 on Reader Service Card

Ready-Power LPG-Electric Power Unit for Sit-Down Trucks

MODEL HA-3 FOR 4000-6000 LB. FORK TRUCKS

Now, get the advantages of full-time LPG-electric power for *any* electric, sit-down fork truck, regardless of make or model. Compact Ready-Power model HA-3 accommodates all seating arrangements . . . assures remarkably low-cost operation . . . minimizes objectionable fume problems. Compact LP-Gas cylinder is mounted on top of engine-generator housing for quick, easy interchangeability. Hinged cover and side plate give easy access to engine accessories; removable end plate permits service of generator. LP-Gas components are listed by Underwriters' Laboratories and comply with Factory Mutual recommendations. Write today for full information.



READY-POWER

The READY-POWER Co., 3820 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

FACTORY / LETTERS
Begins on page 8

operating the machines are on an incentive program. However, when maintenance or repair is necessary for the machines, the maintenance personnel are not on such a program. Considerable friction and ill-will is thus generated.

An article on p. 88 of the April 1956 issue of FACTORY, "Newest Way to Avoid Downtime," contains information that might be applied to this problem. We would appreciate knowing if further information is available in back copies.

Donald C. Lucas
Project Coordinator
Walter Kidde Engineers—
Southwest Inc.
1205 Holman Ave., Houston 4, Tex.

► We were able to give Mr. Lucas reference to nine articles. Anyone else have the same problem? If so, just drop the Editor a note—ED.

QUOTED IN INDIA

Sir:

My last letter asked for permission to quote an example from your interesting article on Brainstorming published in June 1956.

Although the permission to quote came very promptly, I must confess it was not until May 1957 I could complete the article because of the heavy pressure of work. My article which has now been published by the *Indian and Eastern Engineer* is being sent to you by second class air mail and I am sure you will enjoy reading it.

S. H. Phorwani
Chemical Engineer, "Jadubas"
Bombay, India

► Enjoy it we did. And for anyone else who wants permission to quote from FACTORY for an article, we're glad to cooperate. But because of copyright laws, we must have your request in a letter. Just tell us the exact material you want to quote (with any illustration you'd like to reproduce) and the use you want to make of it (name of journal, or house organ, internal distribution, etc.) Write: Chief Editor, FACTORY, 330 West 42nd St., New York 36—ED.

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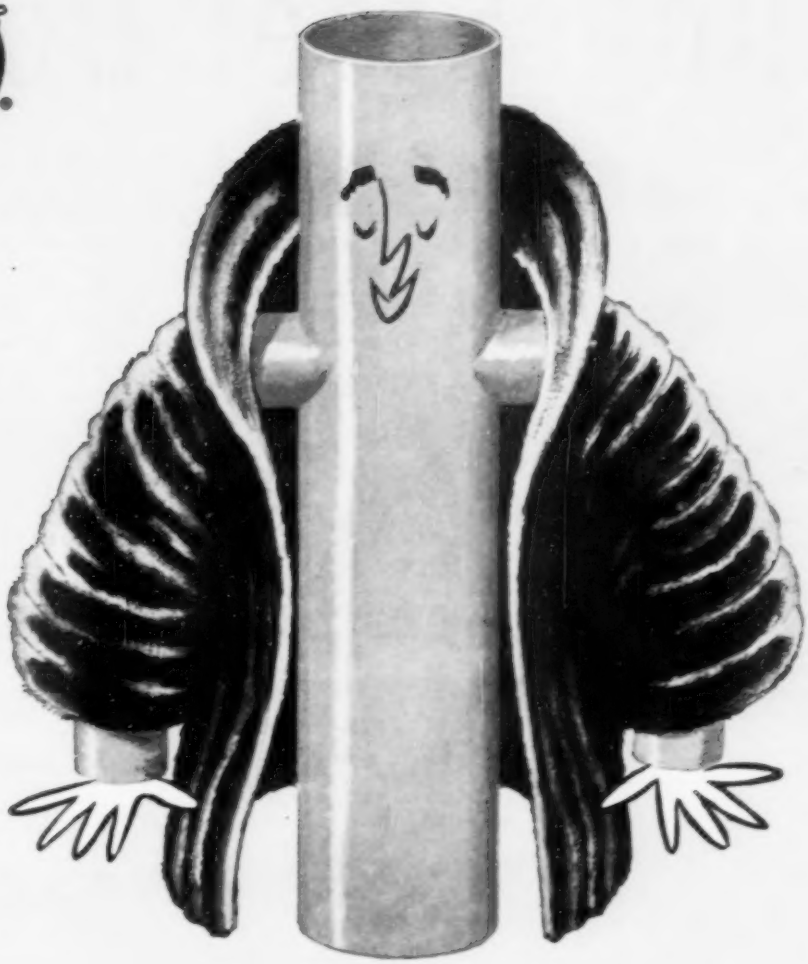
Barrett



WHY USE MINK COATING?

You can't afford luxuries in these times of tighter operations! You must secure maximum corrosion protection at the best price. Barrett Protective Coatings offer you high-grade coal-tar materials that have been **proved and improved for decades—at costs that mean lower maintenance expense for you.** Compare Barrett Cold Coatings to other fine protective materials—the difference with **Barrett** is savings for you. Apply Barrett Cold Coatings by brush or spray without heating or activators. Properties include chemical resistance, heavy coating thickness per coat, and fast drying.

Use economical Barrett Cold Coatings on pipes, valves and connections; fences, grates and other open metal work; interiors of potable water tanks, cranes, conveyors, and handling equipment; and other areas.

Write for full information.

BARRETT PROTECTIVE COATINGS
Barrett Division, 40 Rector Street, New York 6, N. Y.

Allied Chemical

For more facts circle 460 on Reader Service Card

Rolling Steel Doors

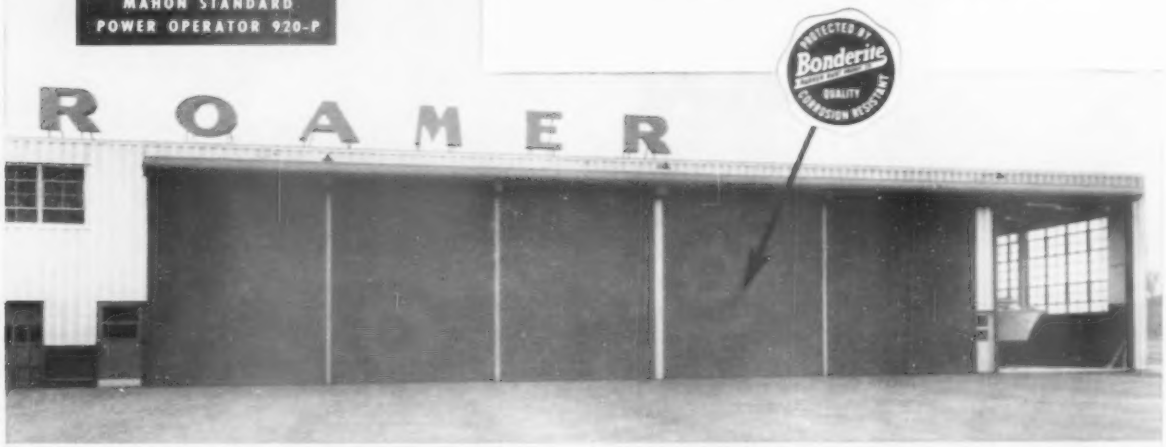
Manually, Mechanically, or Electrically Operated

Power operated rolling steel doors will serve you better in any type of opening . . . they offer definite space saving and timesaving advantages. The vertical roll-up action of the door curtain requires no operating space either inside or outside of the opening, and, there are no overhead tracks to restrict headroom. No other type of door can give you these important operating advantages—and, no other type of door can give you the positive security, firesafety and permanence of a good rolling steel door. When you buy rolling steel doors, it will pay you to check specifications carefully . . . you'll find, through comparison, that Mahon Rolling Steel Doors are built better to give you better service over a longer period of time. See Sweet's Files for complete information, or write for Catalogue G-58.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Underwriters' Rated Metalclad Fire Walls, Insulated Metal Curtain Walls, Electrified M-Floors, Acoustical and Troffer Forms, Acoustical Metal Ceilings, Steel Roof Decks, and Long Span M-Decks.



ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Twenty-two Mahon Rolling Steel Doors are installed in this new, modern plant for the Roamer Steel Boat Division of Chris-Craft Corporation, Holland, Michigan. Mahon also supplied the Insulated Aluminum Curtain Walls and the Steel Roof Deck. Owen-Ames-Kimball Company, Gen. Contrs.

MAHON

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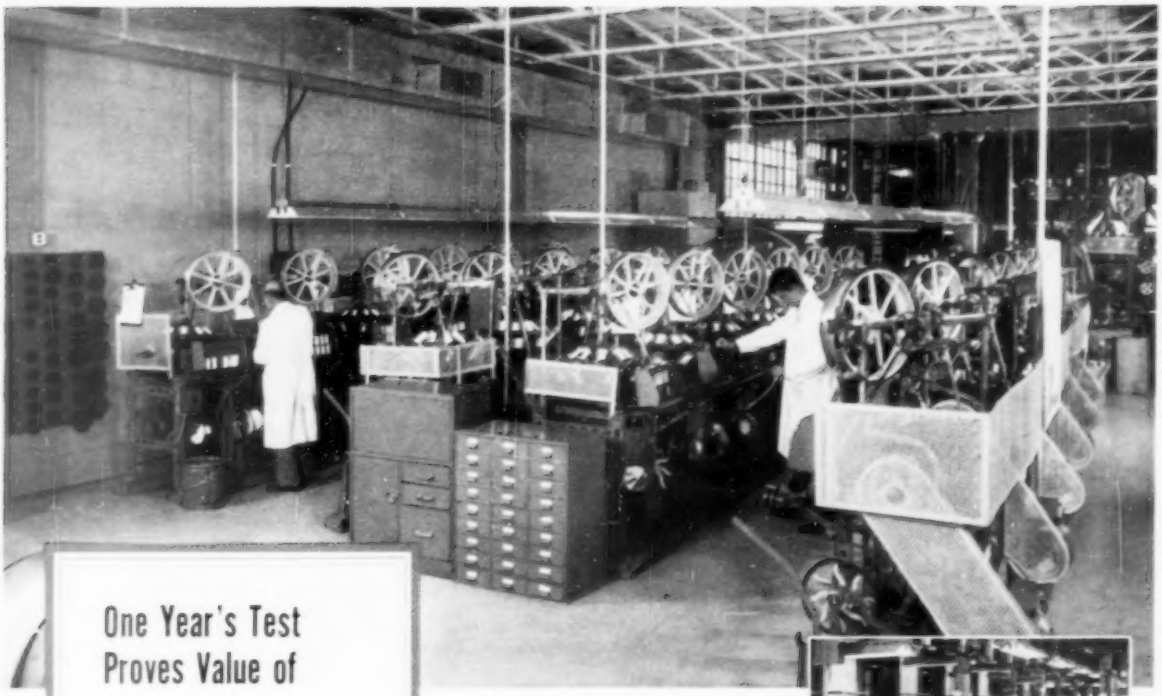
For more facts circle 462 on Reader Service Card ➤



One Year's Test Proves Value of Pittsburgh Color Dynamics in Hitemp Wire Plant

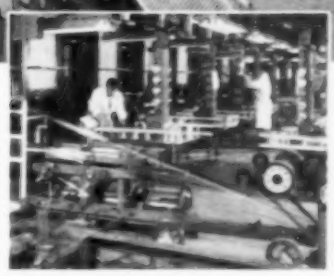
Modern painting system improves efficiency and morale so well it is used throughout specially designed new factory.

One year's test of Pittsburgh COLOR DYNAMICS proved so successful for Hitemp Wires, Inc., of Westbury, N. Y., that this modern system of painting has been used throughout its new 43,000 sq. ft. structure.

• **Hitemp Wires, Inc.,** has grown within seven years into one of the leading manufacturers of high temperature insulated wires and cables. Its products are sold to leading manufacturers of missiles, aircraft and electronic equipment.

• **How COLOR DYNAMICS has helped** to improve efficiency and morale in the Hitemp plant is best told in the words of George F. Rolfe, president: "About a year ago, our rapid growth required the leasing of temporary space. This presented an opportunity to try COLOR DYNAMICS. The results in efficiency, morale and safety for our workers proved so successful, we decided to adopt this painting system as standard throughout our new plant which was especially designed for our kind of production.

• **"Walls, ceilings and every piece** of machinery and equipment were painted according to this system. Moving into this new, efficiently designed structure has improved both volume and quality. While we believe the new facilities have contributed to this betterment, COLOR DYNAMICS has also proved to be an important factor.



• **"COLOR DYNAMICS** has made our new plant more pleasing to the eye, as well as aiding efficiency and morale. It has encouraged good housekeeping and cleanliness, a serious problem in our kind of plant because of the variety of miscellaneous small items used in processing wires and cables. We can heartily recommend this system of painting to industry as a key to improving efficiency, morale and general working conditions."

• **Why not test** the practical value of COLOR DYNAMICS in your plant? Try it on a machine or two, or in a complete department—and see the difference it makes.

Get This FREE Color Plan for Your Plant

• For a complete explanation of the way COLOR DYNAMICS can make your plant more efficient and safer, send for our free, comprehensively illustrated booklet. It tells you how to put color to work for best results. Better still, we'll gladly make a complete color study of your plant or any part of it without cost or obligation. Call your nearest Pittsburgh Plate Glass Company branch. Or mail this coupon.

Send for a Copy of this FREE Book

Pittsburgh Plate Glass Co., Paint Div., Department FW-60, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your booklet "COLOR DYNAMICS."

☐ Please have your representative call for a COLOR DYNAMICS survey without obligation on our part.

Name_____

Street_____

City_____ County_____ State_____

PITTSBURGH PAINTS

SYMBOL OF SERVICE FOR SEVENTY-FIVE YEARS

75 ANNIVERSARY 1883–1958

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

WHEELS

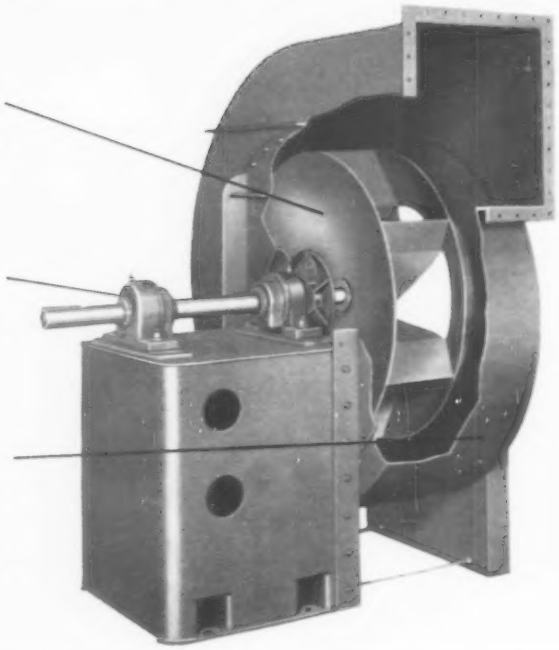
Welded steel construction. One-piece, cone-shaped rims and hubplates, standard or extra-heavy.

BEARINGS

Heavy-duty, self-aligning ball or tapered roller bearings for quiet operation, dependability, long life.

HOUSINGS

Heavy welded sheet steel or plate, adjustable discharge in sizes thru 37" inlet. Fixed discharge on larger sizes. Externally braced for maximum rigidity.



AIR HANDLING
Type AH

MATERIAL HANDLING
Type MH

LONG SHAVINGS
Type LS

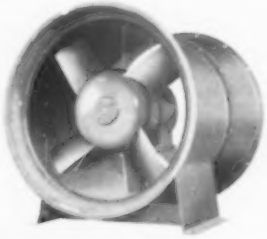
Handle any one of 3 basic processes with an American Blower Industrial Fan

Here's a practical way to solve tough process applications: an American Blower Industrial Fan. It's available with three types of wheels to let you handle air, gases, or air and gases containing material, or long shavings. And there's a wide range of fan arrangements, optional constructions — for severe duties or high-temperature operations — and optional accessories to allow fan modification for individual jobs. Equipment selection and application assistance is available, should you need it, from our 73 engineer-staffed branch offices. A phone call is all it takes to get full product information. American-Standard,* American Blower Division, Detroit 32, Mich. In Canada: Canadian Sirocco products, Windsor, Ontario.

It pays to standardize on American Blower fans for every duty!

HS Fans—direct or V-belt drive, medium-speed operation; nonoverloading.

Sirocco Fans – low speed, quiet operation; move more air per revolution.



Axial Fans—move high volumes in minimum space; flexible installation.

* American-Standard and Standard are trademarks of American Radiator & Standard Sanitary Corporation.

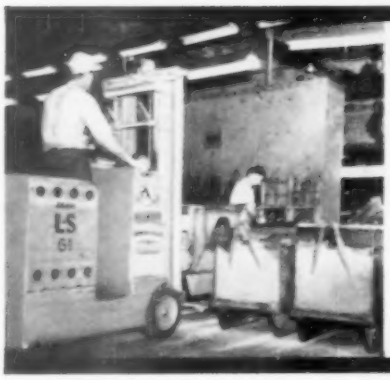
American-Standard PRODUCTS

AMERICAN-Standard

AMERICAN BLOWER DIVISION

Whatever you handle — do it better the L-S way...

CHEMICALS A Michigan producer of chemical products saved 35% in floor space with L-S electric trucks. Seven of their nine trucks run steady for 16 hours a day and the plant management is "highly pleased at the infrequent repairs needed."



CASTINGS A Rhode Island manufacturer switched from hand trucks and storage barrels to L-S electrics and steel drop-bottom boxes. The result? Substantial savings both in space and handling. Materials flow is faster, more dependable, less costly.

PAPER A Maine paper manufacturer reports "Lewis-Shepard electric fork trucks and tractors repaid our investment in six months. We realized a savings of over $140,000 in the first year, with the trucks operating 24 hours a day, seven days a week."

Experienced L-S representatives and the complete job-tailored line of L-S materials handling equipment can provide a better answer to any handling problem.

L-S LEWIS-SHEPARD®

The MASTER® Line — The COMPLETE Line of Materials Handling Equipment

LEWIS-SHEPARD PRODUCTS, INC. • 156 Walnut Street • Watertown 72, Massachusetts

Please send me the following case histories (outlined above) showing how LEWIS-SHEPARD equipment saved dollars by the economical handling of

☐ CASTINGS ☐ CHEMICALS ☐ PAPER

NAME.....TITLE.....

COMPANY.....CITY.....ZONE....STATE.....

◀ For more facts circle 463 on Reader Service Card

For more facts circle 464 on Reader Service Card

No need to reseal every few years . . .

SEALANTS BASED ON LAST MUCH

Modern elastomeric sealants based on THIOKOL liquid polymers are reducing remedial costs. Structures stay sealed for years and years (probably for the life of the building)—despite the most unfavorable weather conditions. The result is low, low maintenance costs . . . because elastomeric-type sealants eliminate the need for constant resealing.

Elastomeric sealants are not just *improved* sealing compounds; they are an entirely *new type* of sealant—a sealant with a synthetic rubber base which provides truly remarkable resistance to heat, cold, wind, chemicals, and other hazards which cause conventional caulking compounds to deteriorate quickly.

It is no wonder, then, that many architects specify only THIOKOL liquid polymer-based sealants when planning the construction of today's most modern buildings.

No shrinkage from freezing temperatures . . . no bleeding from scorching sun!

Elastomeric-type sealants are virtually unaffected by severe temperature extremes which usually deteriorate ordinary sealing compounds. Year in, year out, these modern sealants maintain a firm, yet flexible seal—with no softening or bleeding during summer, and no cracking or shrinking during winter. In fact, whether the thermometer reads 200° *above* zero or 100° *below* zero, you can always depend on THIOKOL liquid polymer-based sealants to hold joints tight, allowing no leakage.

Thiokol® LIQUID POLYMERS LONGER . . . SHARPLY REDUCE MAINTENANCE COSTS!

Extremely resistant to deterioration by rain, ozone, oils and solvents

The continuous beating of wind and rain has no serious effect on joints sealed with THIOKOL liquid polymer-based sealants. During simulated hurricane storms (125 mph winds, and 12 inch per hour rains) these sealants adhere perfectly with absolutely no weakening of the seal. They also withstand the jarring impact of excessive vibration caused by subways or heavy vehicular traffic. In addition, elastomeric-type sealants are totally resistant to the damaging effects of oils, gases, solvents and chemicals.

Easy to apply to most building materials... masonry, wood, glass and metal

One of the most important features of the THIOKOL type elastomeric sealants is that they adhere to most building materials — making them suitable for a wide variety of uses. These sealants consist of a two-package system — a base material and a curing agent which is added just before use. The sealants convert to flexible rubber seals at ambient temperatures.

Thiokol®

CHEMICAL CORPORATION

780 NORTH CLINTON AVE. • TRENTON 7, NEW JERSEY

In Canada: Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ontario

®Registered trademark of the Thiokol Chemical Corporation for its liquid polymers, rocket propellants, plasticizers and other chemical products.

FOR MORE INFORMATION:

Mail coupon to Dept. 43, Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton 7, N. J.

Gentlemen: Please send me the new manual telling the complete story on THIOKOL polysulphide type elastomeric sealants.

Firm.....

Street.....

City..... State.....

Your Name.....

For more facts circle 465 on Reader Service Card

Day-Brite CFI Industrial Fixtures
...start of a great finish

Although the ceiling is almost 40 feet high, Day-Brite CFI-10 (*Comfort For Industry*) fixtures furnish high-level illumination throughout the plant of the Carlisle Finishing Co., at Carlisle, South Carolina. J. E. SIRRINE CO., *Architect-Engineers*, Greenville, S. C.; DANIEL CONSTRUCTION CO., *General Contractor*, Greenville, S. C.; J. FRANK BLAKELY, *Electrical Contractor*, Spartanburg, S. C.

Four 4-foot lamps in each of 26 Day-Brite CFI fixtures flood hookers with light for critical inspection of goods.

Fundamental to the system of quality and cost controls employed by the Carlisle Finishing Co. is lighting. *Comfort lighting* provided by more than 3000 Day-Brite CFI industrial fixtures.

What does your finished product say about the lighting in your plant? Could higher levels of glare-free, shadowless illumination enable workers to make your product better . . . faster?

Let's talk it over. Call your Day-Brite representative listed in the Yellow Pages.

DECIDEDLY BETTER
DAY-BRITE
LIGHTING FIXTURES

Day-Brite Lighting, Inc., 6240 N. Broadway, St. Louis 15, Mo.
Day-Brite Lighting, Inc., of Calif., 530 Martin Ave., Santa Clara, Calif.

Z-252

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

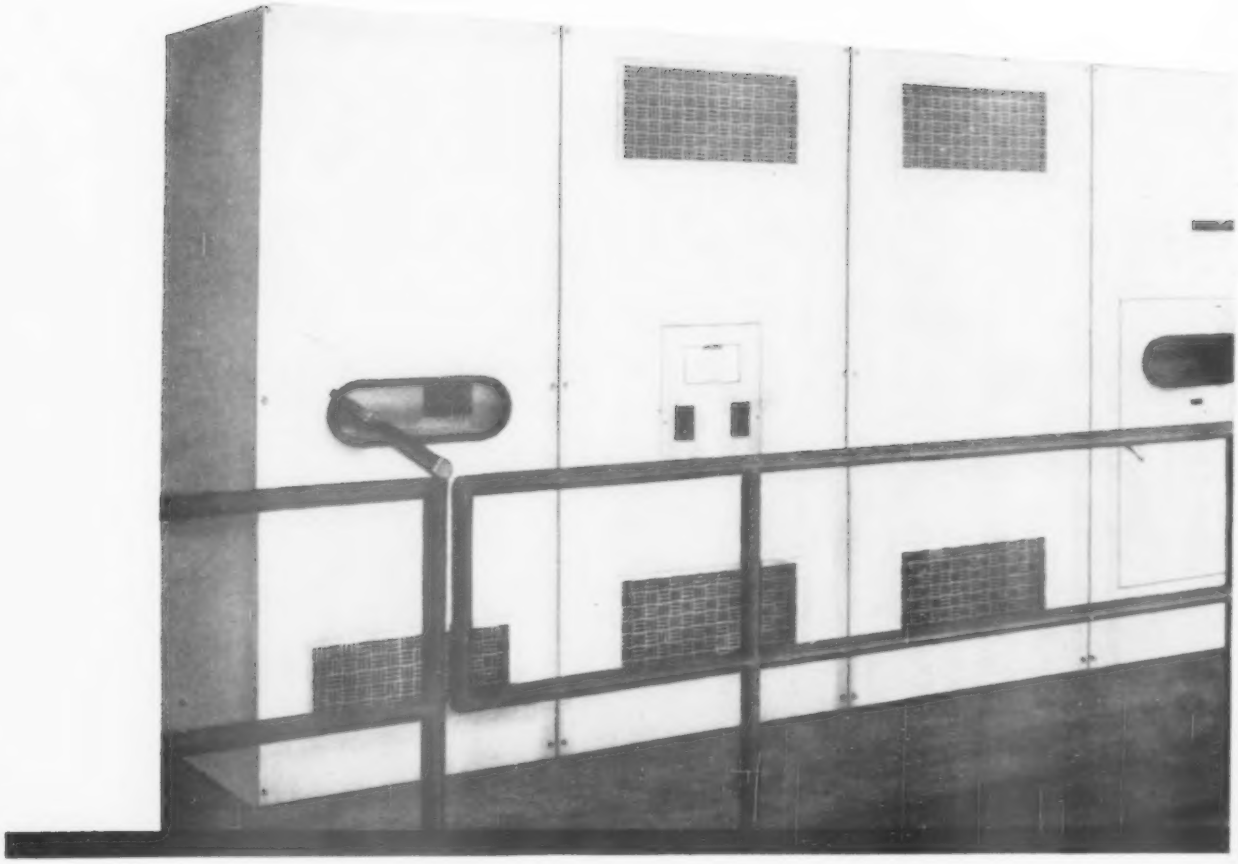
Don't wait for production to force electrical expansion

POWER-UP **to provide electrical capacity that grows at lower cost**

As more machines are added and additional power is required, electrical distribution systems must be able to handle the load. If *your* system is questionable—as 65% of all plants are—*you* need to start a program to POWER-UP . . .

J-96119

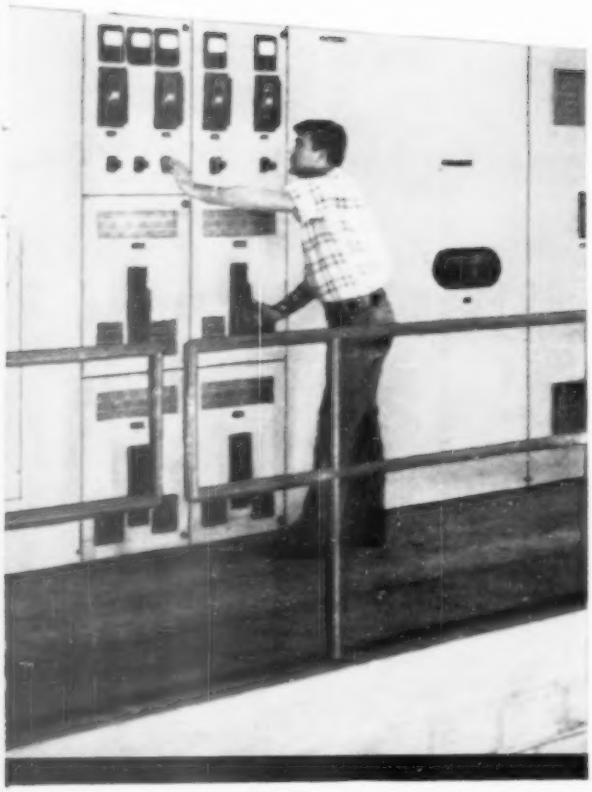
YOU CAN BE SURE...IF IT'S Westinghouse



POWER-UP!

HARVEY ALUMINUM *did...*

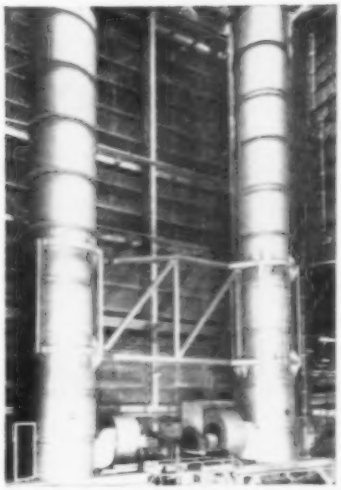
doubled capacity, achieved more economical production than ever before!



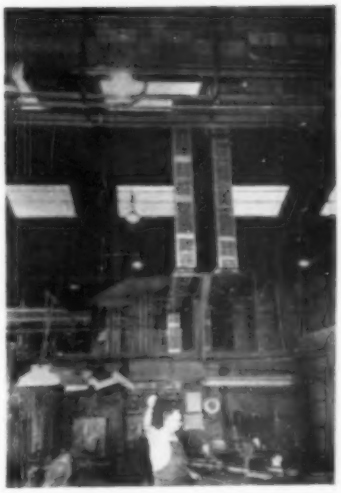
Seven Westinghouse spot network power centers located in major production areas supply motor loads, induction and resistance-type furnaces and the mercury lighting system.

"The Westinghouse 480-v color-corrected mercury-vapor lighting system is remarkably superior to conventional lighting," says Mr. Lawrence Harvey, Executive Vice President. "It is not only less expensive to operate at the same level of illumination, but replacement and maintenance costs are reduced."

Twin 110' Westinghouse electric furnaces are powered by a specially engineered system providing for cyclical furnace loads, and at the same time, making maximum use of network capacity.



Westinghouse bus duct, carrying power throughout the plant, is another key to distribution system flexibility. Here, two runs of ventilated low-impedance duct from the transformer feed individual branch runs of 1000-amp plug-in duct.



Harvey Aluminum doubled productive capacity and cut per-pound production costs as well. Their large-scale expansion program had called for extrusions of unprecedented weight and dimensions. Investigation proved that flexible high-voltage electrical distribution was the primary power requirement. Two incoming circuits at 13.8 kv established primary voltage. A spot network system, comprised of seven load centers, was installed at major load points and serves equipment throughout the plant through low-impedance and plug-in bus duct. This basic system is ideal for unbalanced and shifting furnace-heating loads. Service continuity is assured, and voltage regulation has measurably improved. Future relocation of machinery and unpredictable changes of equipment, too, have been provided for. This high order of electrical planning has helped maintain Harvey's position as one of the world's lowest cost producers of fabricated aluminum.

Is yours a problem of production changeover, new products, or rising costs and a profit squeeze? Your electric utility sales engineer or your Westinghouse representative can help you with a practical solution . . . Power-Up!

J-97218-A

YOU CAN BE SURE...IF IT'S Westinghouse

Here's how a

POWER-UP

program

assures

electrical

capacity

for today

and tomorrow

When you modernize your plant for lower costs, power consumption will increase. It may be six months — or six years — before you do it, but you shouldn't have to replace your electrical distribution system.

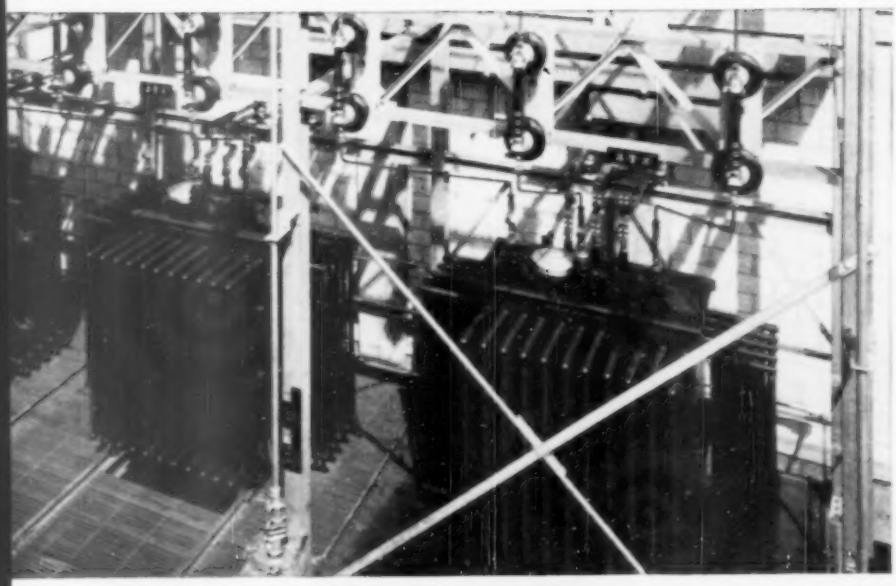
That's why it is important that you call on Westinghouse now for POWER-UP planning assistance and work-together equipment. Industry-experienced engineers will help you get full capacity today — plus a growth design for tomorrow.

A MODERN WESTINGHOUSE DISTRIBUTION SYSTEM brings advantages of convenient arrangement, easy maintenance and provisions for load growth. There's profit in planned power — call your Westinghouse salesman. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

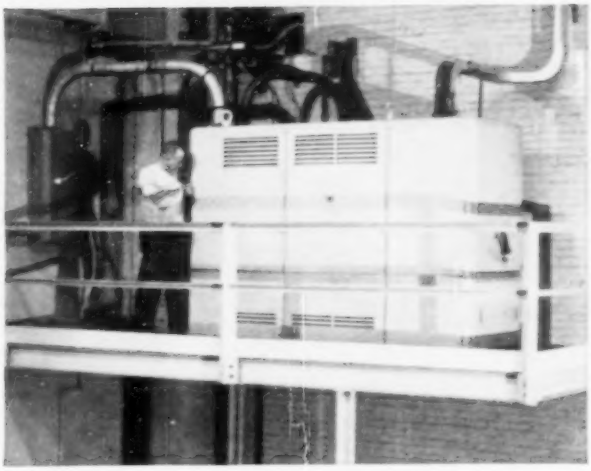
J-96103

YOU CAN BE SURE...IF IT'S

Westinghouse

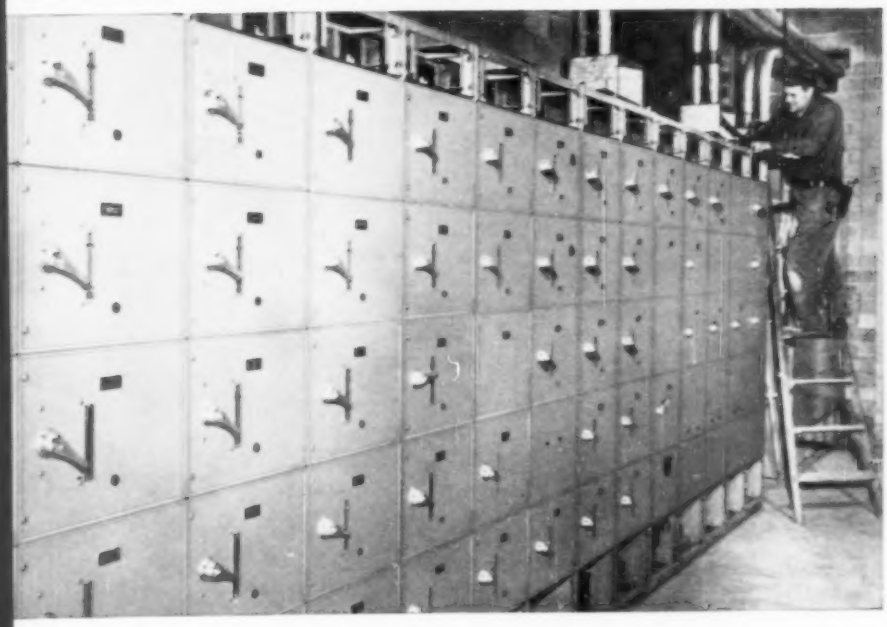


Westinghouse Outdoor Substation Design means savings right from the start with just one source of responsibility. Later expansions are simple when additional transformer capacity is added to meet the increasing demands. Units are protected from weather, yet are easily accessible for maintenance.

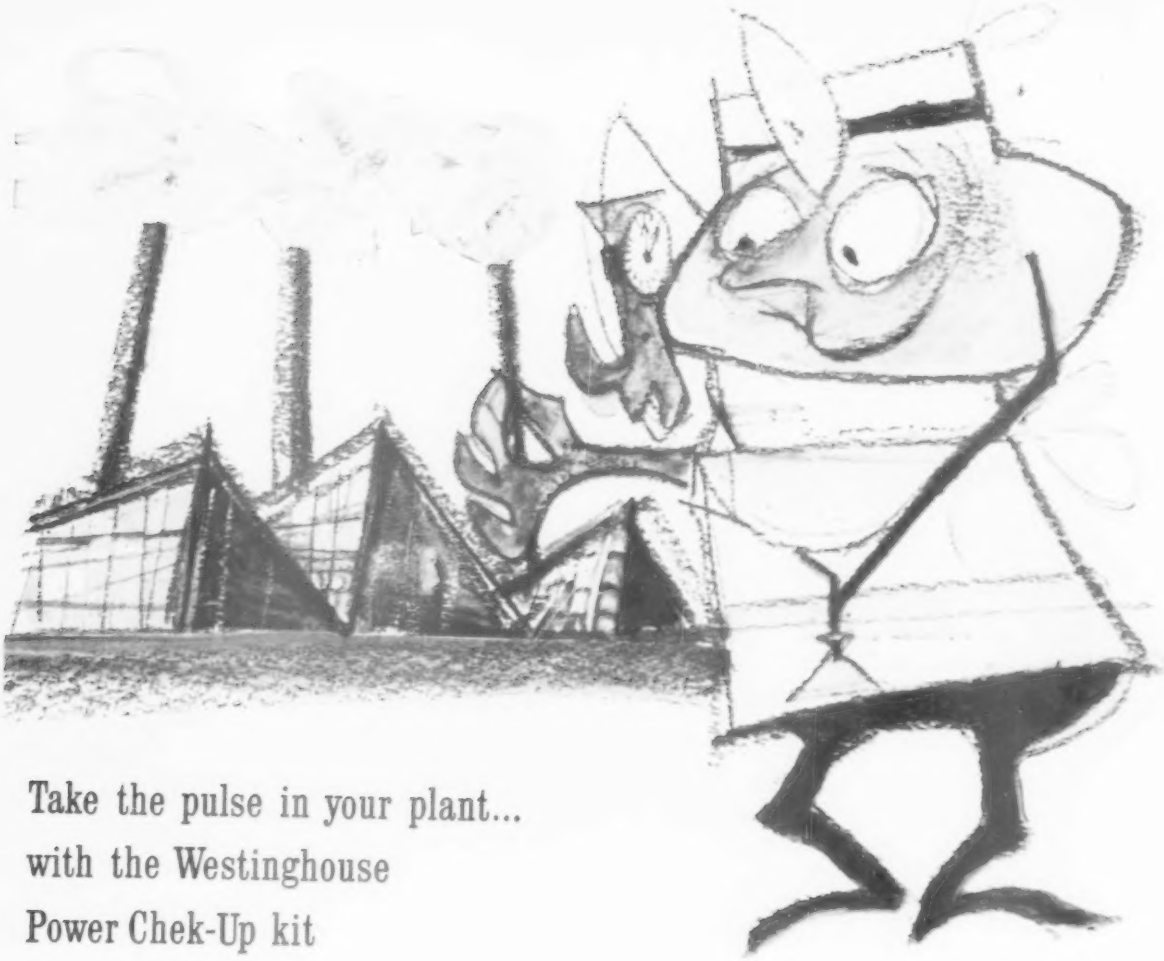


Westinghouse Standardized Metal-Clad Switchgear provides superior circuit protection with Type DH air circuit breaker to accomplish fast and positive arc interruption. Centralized circuit control and protection are afforded for generators, motors, bus and feeder up to 13.8 kv.

Westinghouse Power Centers, located at the load, are geared for today's production with growth flexibility for tomorrow's requirements. Dry-type self-contained power centers eliminate fire hazard. Location close to load shortens secondaries, reduces line loss, gets more work from motors. Units are 20-40% lighter than liquid-filled . . . suitable for easy balcony mounting.



Westinghouse Control Centers, proved industry's safest through testing under maximum fault conditions, offer these outstanding design features: interchangeable 9½- and 14-inch modular units, front accessibility for easy inspection, tilt-out lock-out positioning, each starter baffled to prevent spread of fault, heavy-gauge metal construction. Units reduce installation costs substantially.



Take the pulse in your plant... with the Westinghouse Power Chek-Up kit

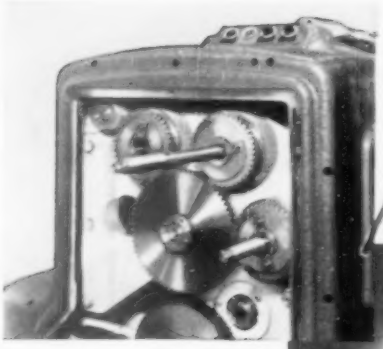
Production problems because of low voltage? Interrupted service? Maintenance costs too high? . . . Then your plant needs an electrical check-up . . . 65% of all plants do! It's easy to see where electrical inadequacy is costing you money when you use the new Westinghouse Power Chek-Up Kit.

The necessary forms, an easy-to-work slide rule and an instruction book are all included. Ask your utility or Westinghouse salesman for details on how to get a kit.

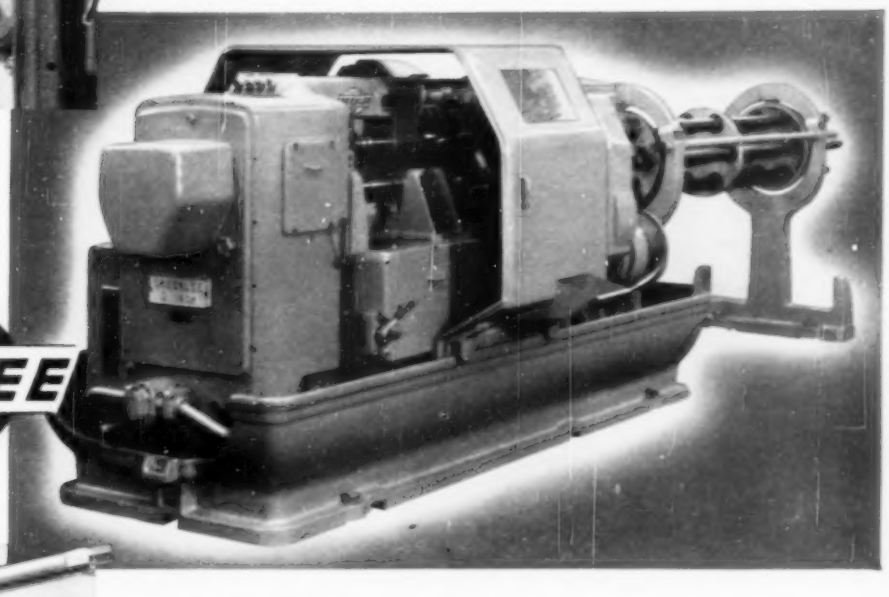
J-06120

YOU CAN BE SURE...IF IT'S Westinghouse

For more facts circle 467 on Reader Service Card



GREENLEE LEAD-SCREW FEED ASSURES *Precision* THREADING and TAPPING



PRODUCTION MACHINERY

GREENLEE

PRODUCES UNIFORM HIGH QUALITY... Reduces Scrap ... Lowers Costs!

The Greenlee precision lead-screw threading arrangement makes it easy to machine parts otherwise impractical on an automatic bar machine. Precision Acme, tapered and multi-lead threads are machined in the high speed and feed ranges required. Smooth, clean thread form, fine fit and high tolerance concentricity make lead-screw threading profitable. Built-In Duplex clutches on 6-spindle machines reduce set-up time on simultaneous tapping and multi-tooled jobs. The profitable lead-screw arrangement can be applied to Greenlee machines in the field as well as on new Greenlee Automatics. It will pay you to investigate.

Want more information? Write today for Catalog A-405.

GREENLEE BROS. & CO.

2226 Mason Ave.

Rockford, Illinois

For more facts circle 468 on Reader Service Card

Super-Duty 7" Model 853 (6000 rpm) with 50% power increase for toughest assignments. New features incorporate every improvement you want.

2 NEW SKIL DISC

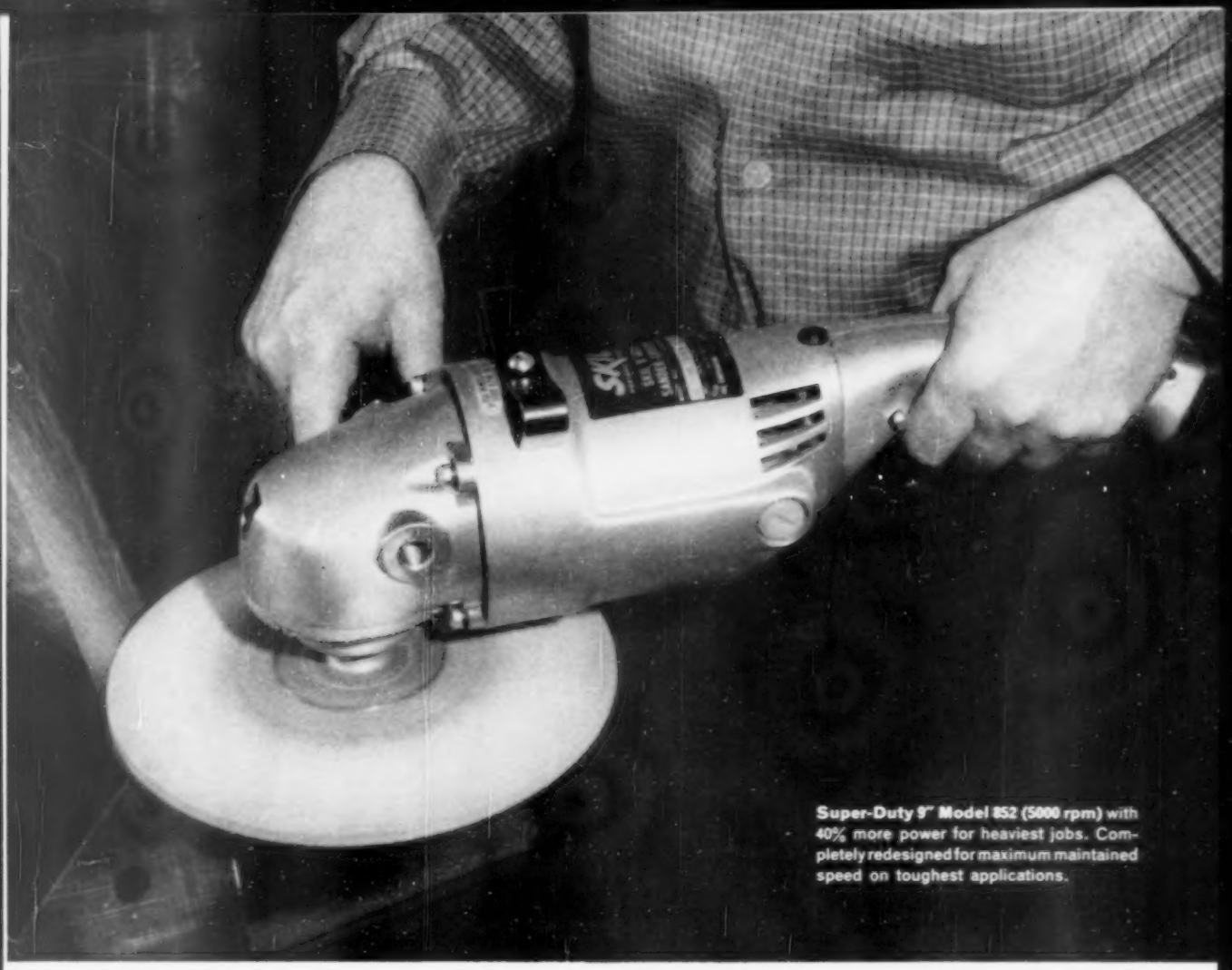
...answer operator pleas

It's now possible for super-duty disc sanders to cut fatigue on the job day after day. The new SKIL 7" Model 853 and 9" Model 852 are those tools.

They're designed for easier handling on rugged, tough, demanding work, month in and month out.

They are lighter in weight and smaller in size than other makes of heavy-duty disc sanders. And they give *perfect balance* in an operator's hands. They combine all the features that men on the job prefer for continuous sanding, grinding or wire brushing.

Work doesn't just *seem* to go faster; jobs actually *are* completed in less time. Big 2.5 hp motor gives the most disc sander power available. This extra powerful motor maintains higher constant speeds even under the toughest specifications.



Super-Duty 9" Model 852 (5000 rpm) with 40% more power for heaviest jobs. Completely redesigned for maximum maintained speed on toughest applications.

SANDERS

for *Easier Handling*

New design of Models 853 and 852 has ball bearings mounted in steel inserts—drops wear and power loss. Precision spiral bevel gears are mounted in neoprene for maximum quietness. Reduce gear wear. Forced ventilation controls overheating.

SKIL Disc Sanders have high capacity trigger switches, completely enclosed and dustproof for years of maintenance-free operation. The switch gives instant response from a flick of the finger, is held "ON" by a thumb operated locking button.

You can see why SKIL Disc Sanders pay for themselves faster. Models 852 and 853 are all SKILMANSHIP—with the ability of SKIL Tools to do jobs faster, easier and cheaper. Ask your SKIL distributor for a FREE demonstration of their money-saving features.

STANDARDIZE ON SKIL

Nationwide, manufacturers are finding it saves them money to adopt SKIL for every portable tool operation. The SKIL 35-branch factory organization gives fast efficient service on every tool. You'll cut costs if you—STANDARDIZE ON SKIL.

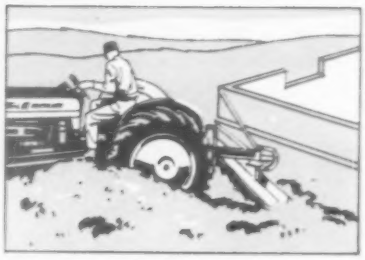
SKIL

Made only by SKIL Corporation, manufacturer of famous SKIL and SKILSAW products. 5033 Elston Ave., Chicago 30, Ill. In Canada: 3601 Dundas Street West, Toronto 9, Ontario.

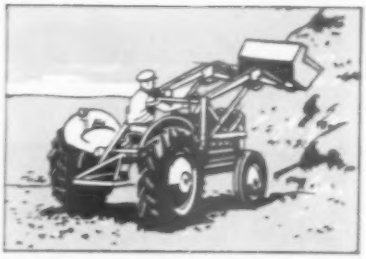
For more facts circle 469 on Reader Service Card

Here's why

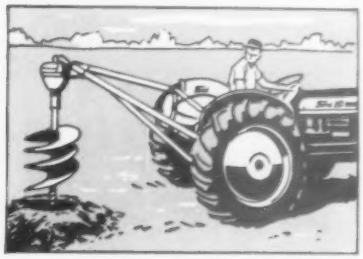
DIGGING MACHINE PITS—Ford's compact, close coupled design gives you an excellent power unit for heavy digging in close quarters.



BACKFILLING—Front and rear mounted Ford blades handle a wide range of grading, leveling and dozing jobs around the plant, easily reverse for backfilling.



STOCKPILING AND CLEAN-UP—The Ford Industrial "Step-on" Loader outperforms any other loader in the 1000-lb.-capacity class . . . many "bigger" loaders.



LANDSCAPING—Ford's "Economy" Post Hole Digger is another of the tools which keep your tractor working around the clock, around the calendar.

SNOW REMOVAL—Front-mounted blade snow plow makes quick work of snow removal, takes winter weather problems in stride.

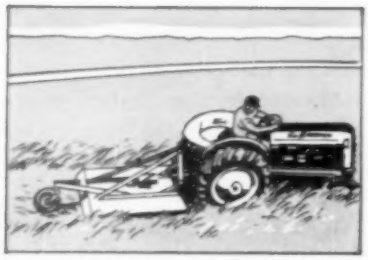
LIFTING AND STACKING—Inside the plant or out in the yard, the Ford tractor and a fork lift make an excellent team for spotting and stacking pallets.

FORD should be

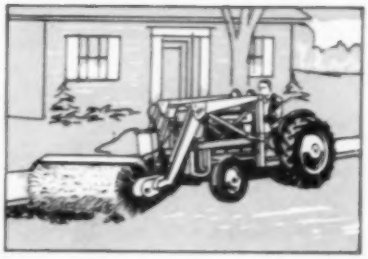
standard equipment in your plant...any plant!

Inside, outside, all around the plant . . . FORD does more jobs . . . better! Ford Tractors and half-a-hundred power partners are designed for fast, low cost handling of an almost endless number of maintenance, clean-up and materials handling jobs in and around factories of all sizes. Whatever *your* job needs in the way of power and versatility . . . regardless of the size of your operation . . . there's a new Ford tractor with full range of attachments to do the work better than ever . . . and for less. Baby your budget! "Tool up" with Ford! You can get all the facts from your nearby dealer, or write to Industrial Sales Department, Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

YOU SEE MORE FORDS BECAUSE THEY SAVE MORE MONEY!

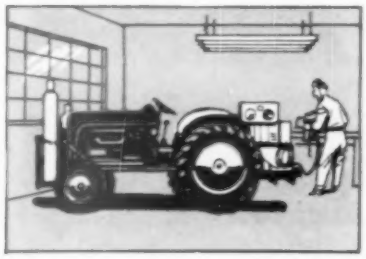


BRUSH CLEARING—Ford offers 3 different models of rotary cutters with up to 100" cutting width for fast, economical brush cutting and big-area mowing.

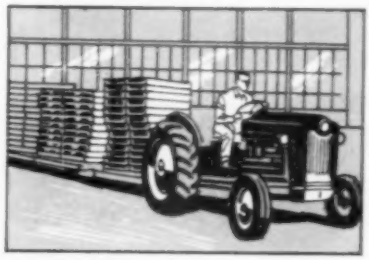


SWEEPING—Company streets, driveways, parking lots are kept clean with a minimum of time and labor when a broom is numbered among your Ford attachments.

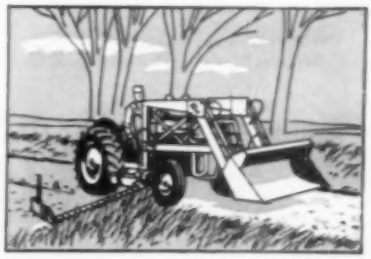
MATERIALS HANDLING—Rear-mounted crane adds extra reach and lift height to your Ford tractor for still more versatility in handling bulky materials.



MOBILE WELDING—Complete welding assemblies can be mounted front or rear on the Ford tractor to provide a self-powered unit for work *anywhere*.



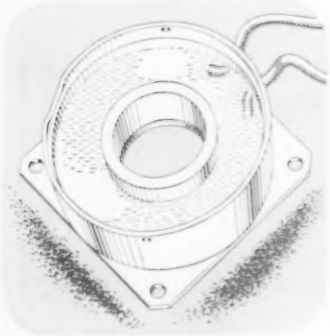
TOWING—Here's the lowest cost drawbar horsepower on the market! Inside or out . . . down narrow aisles or over muddy, rutted ground . . . Ford has no equal.



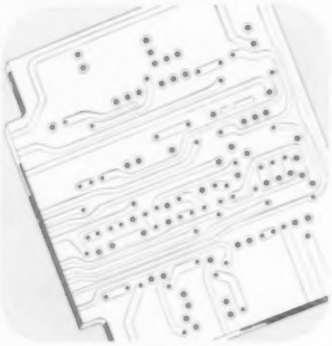
MOWING—Side mounted, rear-mounted and hydraulic mowers . . . all kinds, all sizes are available for Ford. Almost any man at your plant can operate a Ford!

For more facts circle 470 on Reader Service Card

How you can cut time and costs with R/M *Ray-BOND* Adhesives



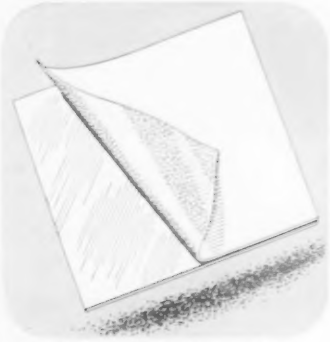
Casting compound for electrical applications



Bonding printed circuits

Bonding textile to textile

Bonding synthetic foam to metal in auto armrest



Bonding "Teflon"* to steel
*A Du Pont trademark

Sealer for automobile window channel

FOR THESE AND 1001 OTHER APPLICATIONS NEW R/M RAY-BOND ADHESIVES CAN BE TAILORED TO YOUR NEEDS

The number of new places you can use adhesives today is growing faster than ever. With new bonding techniques, with modern Ray-BOND adhesives, you can cut fastening time and costs in a variety of applications never possible before.

R/M Ray-BOND adhesives are of two different types—thermosetting and thermoplastic. They are available in different degrees of viscosity—for either spraying or painting. They give top performance under the most severe operating conditions—withstand temperature extremes ranging from -80° to +700°F.

Whether or not you've yet considered bonding, laminating, sealing or coating in your own operations, talk to an R/M engineer now. From over 20 years' pioneering in the production of bonded assemblies and the manufacture of adhesives and coatings, R/M has acquired a wealth of knowledge and experience that might help you find new ways to improve your product or cut costs. Write or call for complete information on new Ray-BOND adhesives now.

R/M Bulletin No. 700 contains engineering information you will want on Ray-BOND adhesives, protective coatings and sealers. Write for your free copy.

RAYBESTOS-MANHATTAN, INC.

ADHESIVES DEPARTMENT: Bridgeport, Conn.

Chicago 31 • Detroit 2 • Cleveland 16 • Los Angeles 58

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; Passaic, N.J.; No. Charleston, S.C.; Crawfordsville, Ind.; Neenah, Wis.; Paramount, Calif. Raybestos-Manhattan (Canada) Limited, Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC.: Industrial Adhesives • Brake Linings • Brake Blocks • Clutch Facings • Industrial Rubber • Engineered Plastics • Sintered Metal Products Rubber Covered Equipment • Asbestos Textiles • Laundry Pads and Covers • Packings • Abrasive and Diamond Wheels • Bowling Balls

For more facts circle 471 on Reader Service Card

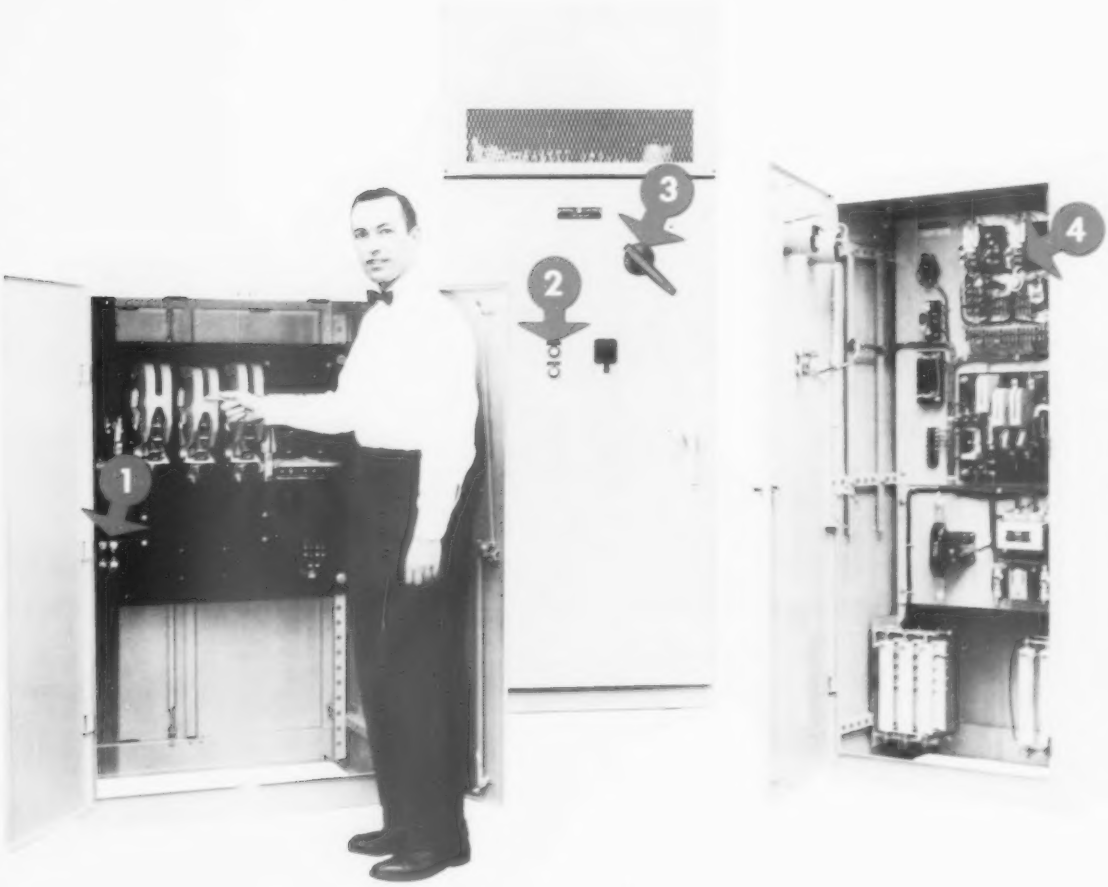
For more facts circle 472 on Reader Service Card ➤

IN 96 SECONDS, *see how every member of General Electric's motor-control family offers feature after feature for . . .*

Greater protection of your equipment and personnel

GENERAL ELECTRIC

Get greater protection of equipment



LOW-VOLTAGE INDIVIDUAL STARTERS

For squirrel-cage, wound-rotor and synchronous motors

1. **OVERLOAD RELAYS** on General Electric's individual motor controls constantly protect the motor against damage from overloads.

2. **UNDERVOLTAGE PROTECTION** is provided by momentary-contact pushbuttons on applications where automatic restarting after power loss is not desired. Undervoltage release by maintained-contact pushbuttons is available for applications where automatic restarting is desired.

3. **SHORT-CIRCUIT PROTECTION** against faults up to 100,000 amperes can be provided. Fuses, circuit breakers, and fuse-breaker combinations are available.

4. **SYNCHRONOUS MOTOR PROTECTIVE SYSTEM** allows maximum utilization of the motor, yet gives full protection against out-of-step operation with field applied. Squirrel-cage winding has graduated protection that prevents overheating during starting, yet does not cause unnecessary tripping.

Write for bulletin GEA-6584 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

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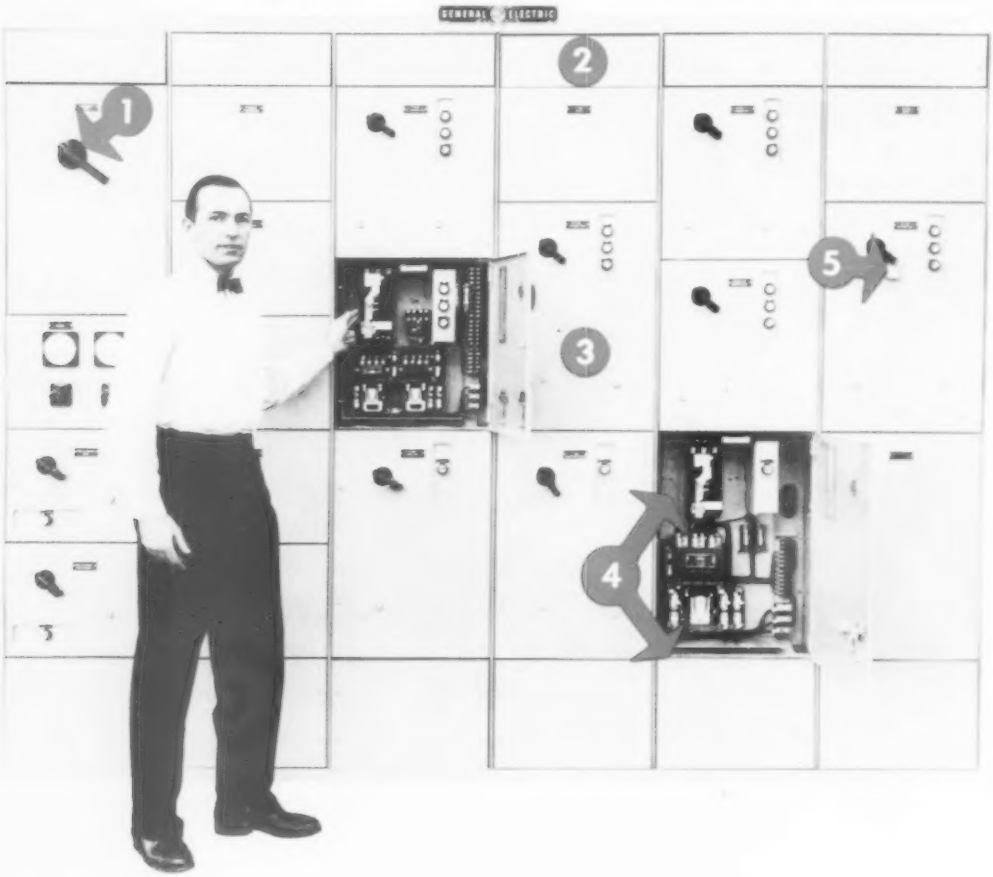
and personnel with these features



LOW-VOLTAGE MOTOR CONTROL CENTERS

For flexible grouped control of motors up to 400 hp

1. **INTERLOCKED DOOR HANDLES** automatically operate the breaker or fused switches and de-energize the starter units when handles are turned to "OPEN" position, thus the doors cannot be opened when the starter is energized.

2. **SHORT-CIRCUIT PROTECTION** up to 100,000 amperes is available with fuses or reactor in incoming line.

3. **STURDY ENCLOSURE** is constructed of bolted sheet-metal with an "I-beam" frame. This protects starters and internal wiring from mechanical damage. Full-length floor sill adds to strength of enclosure.

4. **ISOLATED STARTER COMPARTMENTS** are separated from the main power bus and other starter compartments by horizontal and vertical metal barriers.

5. **LOCKING DEVICE** on compartment handle can be used to lock starters in position to prevent unauthorized operation and to prevent starter from being energized during maintenance.

Write for bulletin GEA-4979 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

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GENERAL ELECTRIC

es of General Electric motor control

*Reg. Trade-mark of General Electric Co.

LOW-VOLTAGE CABINETROL* POWER CENTERS

For custom-engineered grouped control of motors up to 900 hp

1. **METAL BARRIERS** between starter compartments protect personnel during inspection and maintenance. Starter compartments are isolated from each other and from the main bus.
2. **RUGGED ENCLOSURE** of these General Electric power centers is constructed of welded one-piece sheet steel to protect starters and internal wiring from mechanical damage.
3. **SHORT-CIRCUIT PROTECTION** up to 100,000 amperes is available for the power center in any one of three systems: fully rated, cascade, or backup.
4. **CAPACITOR BANKS** for power-factor correction can be provided to protect against excessive power losses.
5. **INTERLOCKED DOOR HANDLES** on the Cabinetrol power centers require that the starter unit is de-energized before door can be opened. Breaker handle can be locked in position and each compartment has a separate cylinder lock to prevent unauthorized entry.

Write for bulletin GEA-3856 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

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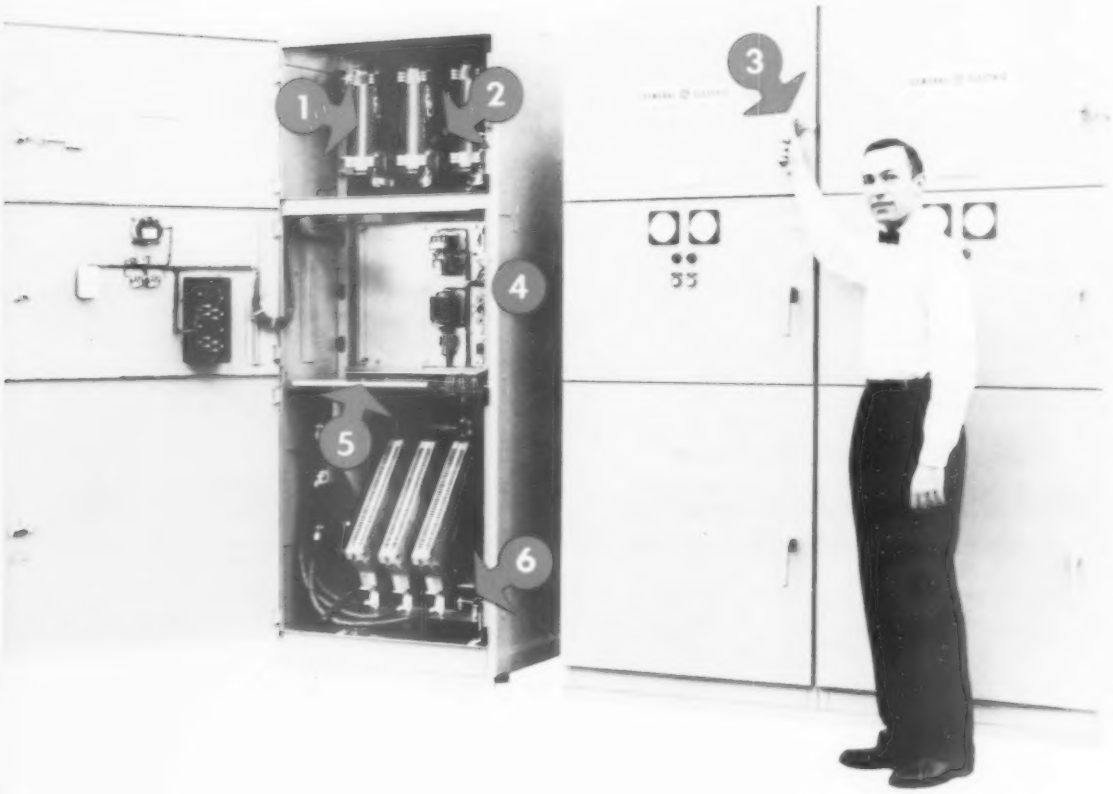
GENERAL ELECTRIC

and personnel with these features



*Reg. Trade-mark of General Electric Co.

MEDIUM-VOLTAGE LIMITAMP* STARTERS

For individual or grouped control of motors up to 3000 hp

1. **HIGH-INTERRUPTING CAPACITY** fuses limit fault current within ¼-cycle. Limitamp starters have short-circuit capacities up to 150,000 KVA at 2300 volts, and 250,000 KVA at 4000 or 4600 volts, 60 cycles.
2. **VISUAL CHECK** of three-phase isolating switch shows personnel that unit is isolated from high-voltage power.
3. **ISOLATING SWITCH** is operated from outside the enclosure. High-voltage compartment doors cannot be opened until starter has been isolated from incoming power.
4. **MOTOR IS PROTECTED** against overload by ambient-compensated overload relays. All Limitamp control components are co-ordinated to withstand the stresses of short circuits.
5. **METAL BARRIERS** separate the high-voltage and the low-voltage compartments.
6. **INTERLOCK SYSTEM** on this General Electric control prevents operation of the isolating switch until the contactor has been completely de-energized.

Write for bulletin GEA-6331 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

FOR MORE INFORMATION AND APPLICATION ASSISTANCE on any of G.E.'s motor controls, contact your G-E Apparatus Sales Office.

LIFT

GENERAL ELECTRIC

How your truth dollars help keep the Reds in the red

• The truth dollars you give to Radio Free Europe help keep truth on the air behind the Iron Curtain.

And the truth is an enormously disruptive force to the Reds. For it keeps their captive people thinking . . . wondering . . . and less than completely dominated. The truth keeps needling the Reds. Breaks through their monopoly of lies. Keeps them unsure. Off balance. And thus the truth keeps up to forty fully armed Red divisions tied up policing Russia's satellite countries. Forty divisions, mind you, that might otherwise be put to more aggressive use elsewhere . . . and who knows where?

Your truth dollars keep the 29 super-powered transmitters of the Radio Free Europe network on the air . . . broadcasting the truth behind the Iron Curtain . . . every hour of every day.

Why *your* truth dollars?

Because Radio Free Europe is a private, non-profit organization supported by the voluntary contributions of American business and the American people. And *your* dollars are urgently needed to keep it on the air . . . to help operate its transmitters, pay for its equipment and supplies, and its scores of announcers and news analysts in 5 languages.

Help keep the Reds in the red. Send your truth dollars to Crusade for Freedom, care of your local postmaster.

FREEDOM IS NOT FREE!

Your Dollars Are Needed To Keep Radio Free Europe On The Air

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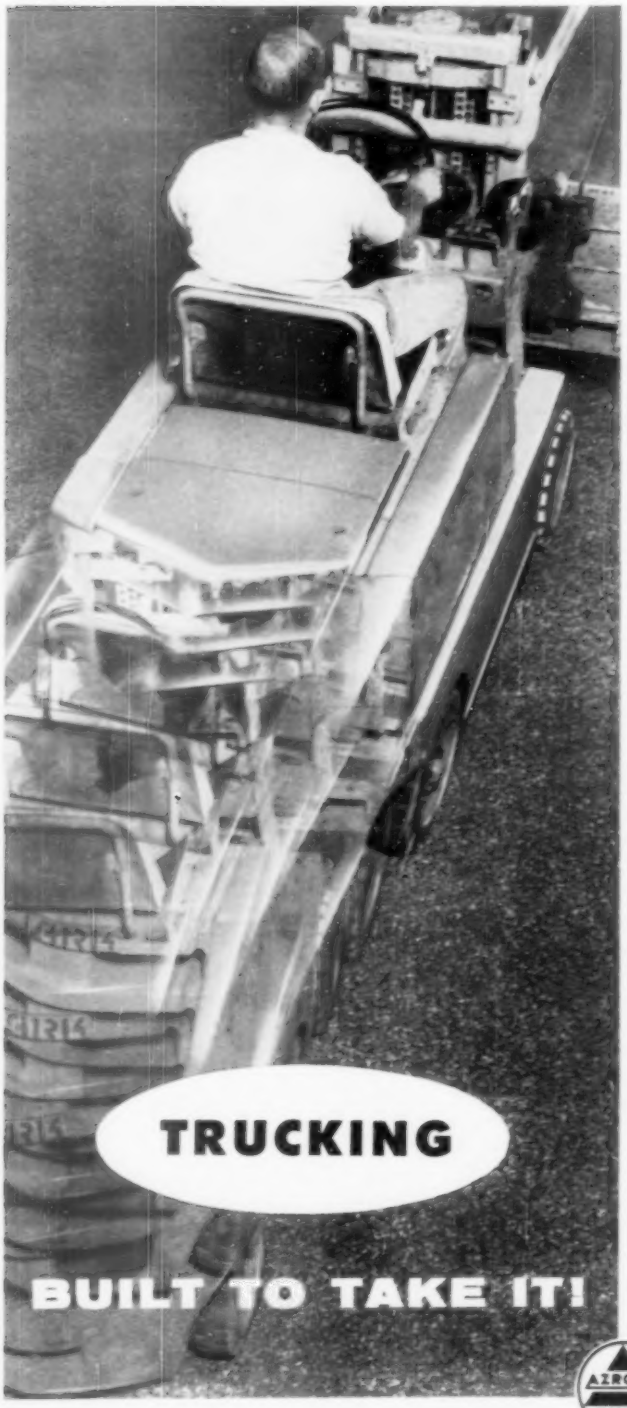

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DURACO® VINYL INDUSTRIAL TILE

Does your floor have the "backbone" to withstand the grinding abrasive abuse of in-plant trucking? Duraco is built to take the punishment of rolling friction and impact – with an all-vinyl binder that won't crack, break up or disintegrate under the toughest traffic.

This remarkable industrial flooring is built to do a better job in plant and factory areas. It's greaseproof and acid-resistant – easier and safer to walk and work on – much easier and quicker to clean. It's the answer to lower floor costs per square foot per year in your plant. Get the facts – write today for Duraco samples and descriptive folders.

SPECIFICATIONS

Available in 5 terrazzo colors, 5 marbleized colors – coordinated with accepted industrial color standards. Size 9" x 9". Thicknesses: Standard Gauge 3/32" – Heavy Gauge ⅛".

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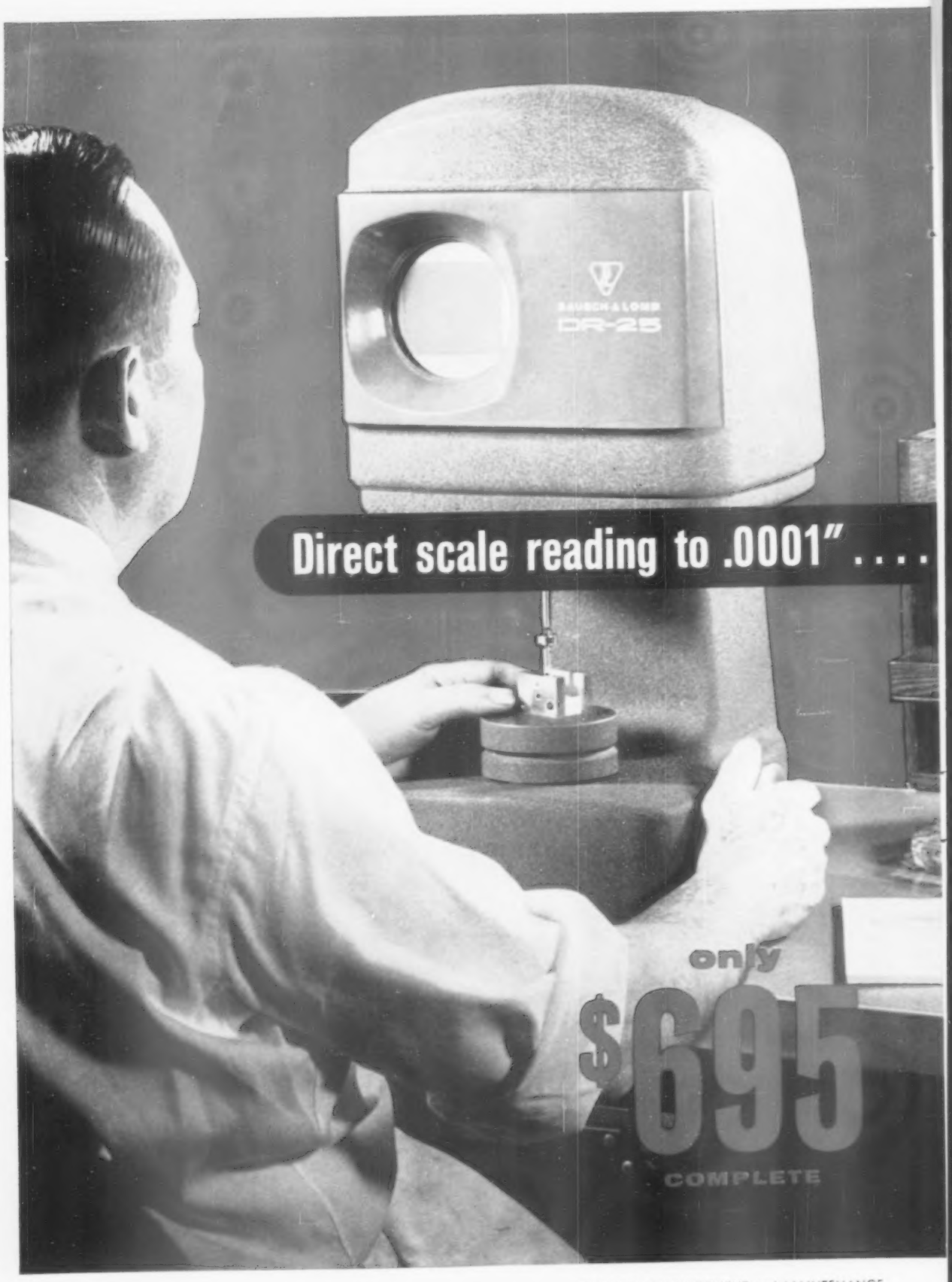
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.....0″ to 3″ range...accurate to .000025″!

FAST, EASY AS A-B-C!

A Just set part to be measured on anvil . . . no masters or set gages needed.

B Turn knob to lower spindle . . . it will stop automatically on contact, with constant spindle pressure.

C See precise measurement at a glance . . . direct-reading scale is illuminated, magnified. No eyestrain, no conversion, no guesswork.

DEPENDABLE ACCURACY!

Direct readings to .0001″; keeps production to quality specification. Master scale ruled on world-famous B&L Grating Ruling Engine. Every DR-25 Optical Gage is accurate to 0.000025″.

PRACTICAL, ALL-PURPOSE!

Direct scale measurement of depth, thickness, height, diameter, taper, angularity of surfaces, runout. Large work table makes it easy to adapt special fixtures. Deep (4¼″) throat, open sides and large staging area accommodate widest variety of work.

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NO OBLIGATION...
JUST MAIL COUPON TODAY!

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SINCE B&L 1853

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BAUSCH & LOMB OPTICAL CO.
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☐ I'd like a free on-the-job demonstration of the new B&L DR-25 Optical Gage, with no obligation on my part.

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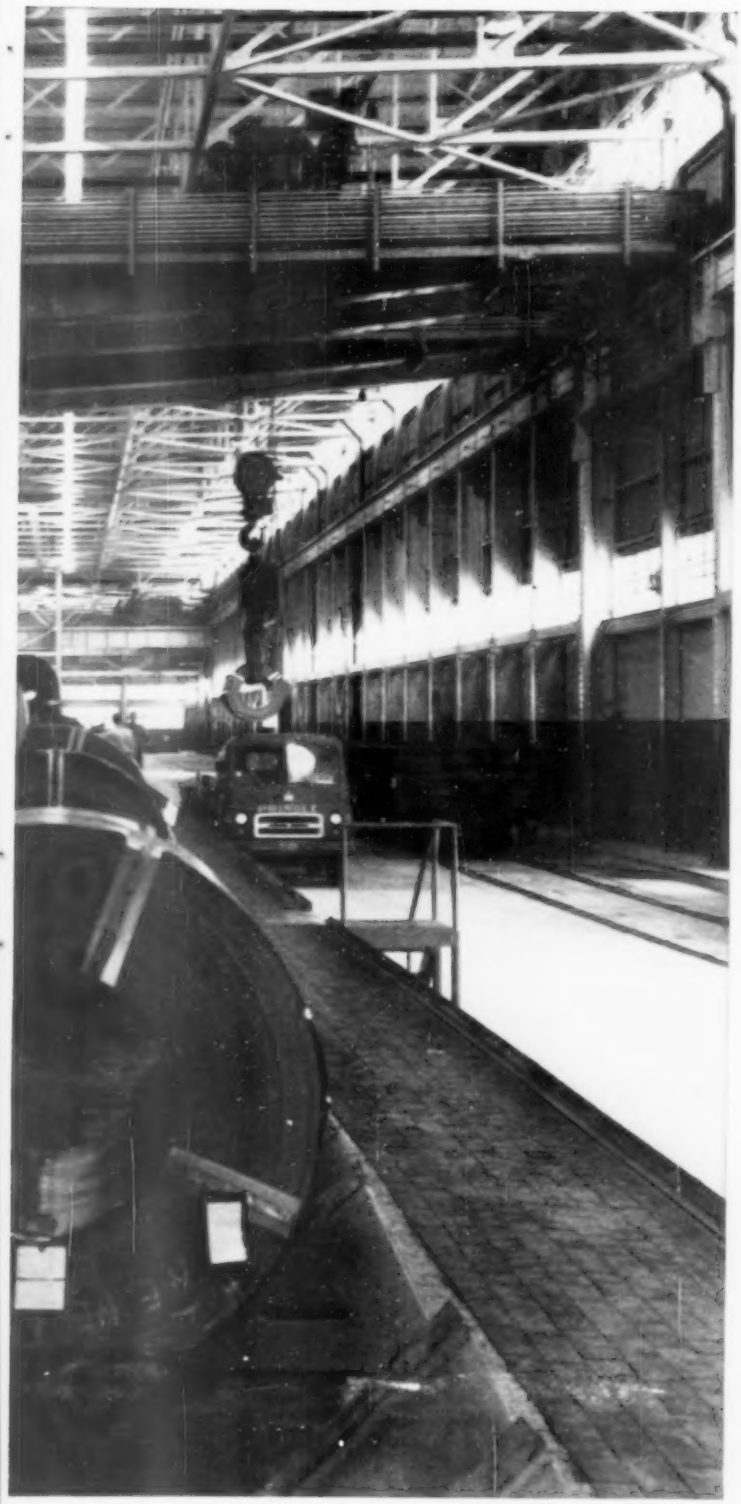
Provide the

right speed



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P&H

Electronic "Stepless" Control

The answer to better material handling often is not higher speed, but better speed *control*. The right speed may be slow one time, and fast the next.

P&H Electronic "Stepless" Control places just this sort of versatile speed control at the crane operator's fingertips — enables him to select just the right speed for each load: Slow, accelerating lifts . . . fast transporting . . . accurate, damage-free spotting. The load moves smoothly through this wide speed range without "steps" of fixed speeds. There's no lurch — no "gear-shift" — to impose strain on bridge or supporting runway and building structure.

P&H Electronic Control is easier to maintain than other controls. It has 58 fewer wearing parts to replace . . . uses a single, sturdy electronic tube with an average life of *over* 15,000 working hours . . . the same control panel fits cranes of every size . . . and Electronic Control can be applied to AC cranes of any make!

Don't prepare another crane inquiry without investigating this amazing development. Write Dept. 112, Harnischfeger Corp., Milwaukee 46, Wisconsin.

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P&H . . . quality and service for 74 years

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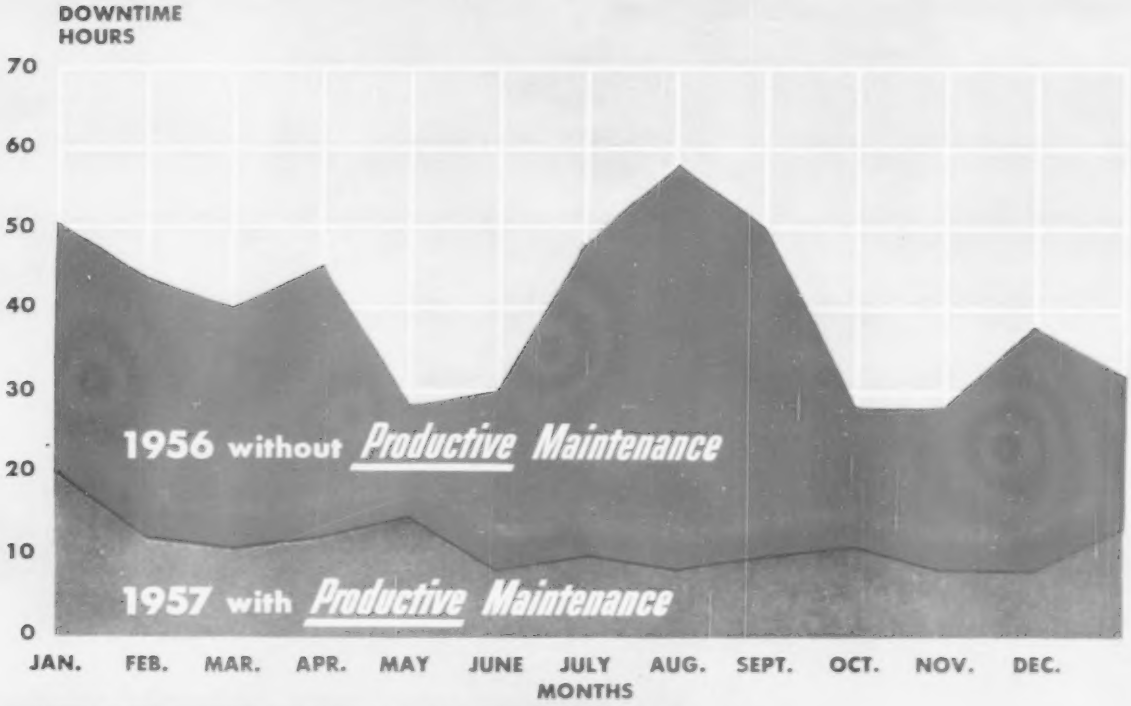
For more facts circle 476 on Reader Service Card ➤

with *Productive Maintenance* in action . . .



◀ **G-E MAINTENANCE SUPERVISOR,** Jim Moncsko (right), integrates maintenance schedules with Small AC Motor Dept. manufacturing personnel.

WEEKLY MEETING of Department's maintenance staff encourages discussion of ways to improve maintenance procedures, areas for cost reductions, schedules, and renewal parts stocking.

Downtime Reduced 75% In One Year At Modern Factory

Since adopting a program of *Productive* Maintenance in 1957, General Electric's Small AC Motor Department, located in Schenectady, N. Y., effected a reduction of 75 per cent in production equipment downtime and further stabilized maintenance schedules by reducing occasions of emergency downtime.

Closely integrated with the manufacturing operation, "SAC's" *Productive* Maintenance Program immediately delivered outstanding benefits. During 1957, for example, *Productive* Maintenance practices applied to an aluminum furnace resulted in a saving of $5,200. Additional cost improvements initiated by the maintenance operation saved the Department more than $60,000.

Unscheduled downtime was further minimized by means of a parts stocking program for all critical production equipment. More efficient utilization of trained manpower and machinery was achieved, repair parts inventories were stabilized, and unit production costs were reduced. Such measured performance receives the full cooperation of Department management, manufacturing, and engineering personnel.

You too can benefit by checking into the advantages of *Productive* Maintenance. Contact your nearest G-E Apparatus Sales Office, or G-E Service Shop for additional information. They will be glad to provide you with *Productive* Maintenance assistance. Also write for bulletins GEA-6087, 5-Steps to Productive Maintenance, and GED-3278, Productive Maintenance In Action, to Section 801-22, General Electric Company, Schenectady 5, New York.

Productive Maintenance—as vital as Production Itself!

GENERAL ELECTRIC

FLEXIBLE, EASY-TO-USE card index simplifies scheduling of routine maintenance. Every item of electrical and mechanical equipment is individually coded for visual identification.

RENEWAL PARTS STOCKING for only critical manufacturing apparatus, keeps spare parts inventory at minimum—reduces investment in non-essential spare parts.

OVERHAUL AND REPAIR of electric apparatus essential to the production process is planned and scheduled in advance with the local G-E Service Shop at Albany, N. Y.

What's the score on your Group Accident & Health Plan?

If you scored any "no" answers to the questions above, better see the *friendly* AM *man* who's an expert on Group Accident & Health Insurance.

He can design a plan for your company with broad coverages custom-fitted to employee needs . . . at low cost to you. Premiums will be subject to an "experience rating" plan . . . helping to stabilize your costs

from year to year. Claims will be handled promptly, thoroughly, fairly.

Hundreds of AM policyholders are lifting employee morale . . . lowering insurance costs with custom-fitted Group Accident & Health Plans. Why not see your *friendly* AM *man* now? American Mutual, Dept. FM-3, 142 Berkeley Street, Boston 16, Massachusetts.

American Mutual

LIABILITY INSURANCE COMPANY

Your friendly AM man can advise you on all your liability insurance needs

Leading writers of Workmen's Compensation, all forms of Liability, Crime, Accident and Health Insurance

For more facts circle 477 on Reader Service Card

Motorola 2-way radio users

INCREASE THE PRODUCTIVITY

of industrial vehicles

34%*

*** Operating records of 45 typical companies prove that 2-way radio increases productive operating hours per day of each vehicle from 5.3 to7.1 —a gain of nearly 2 HOURS A DAY!**

One of the men surveyed put it this way: "Without radio, we would require many more vehicles and men to carry on our present operations."

In plants of all sizes, Motorola 2-way radio enables drivers and machines to increase their productivity. Radio links materials handling vehicles both inside and outside the plant with one central dispatcher . . . helping move *more* materials *faster*, and getting them where they're needed *on time*.

No matter what vehicles your business uses—a fork lift truck, a supervisory car, or a 10 ton truck— you, too, can profit from Motorola 2-way radio. It's simple to obtain your Motorola mobile radio system; all details are handled for you. Motorola's complete 2-way radio "package"—systems engineering, financing, installation and maintenance—assures you of the finest communications system, designed to fit your needs. Get the proof—write today for your Motorola case history portfolio.

MOTOROLA 2-WAY RADIO

Motorola Communications & Electronics, Inc., A Subsidiary of Motorola Inc., 4501 Augusta Blvd., Chicago 51, Illinois

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Penetrates through rust
like coffee soaks into a sugar cube!

How much do you spend on removing rust before you paint? Why not coat right over the sound rusted metal with Rust-Oleum 769 Damp-Proof Red Primer after simple scraping and wire-brushing to remove rust scale and loose rust . . . saving time, money, and metal! Rust-Oleum's specially-processed fish oil vehicle penetrates* through rust to bare metal—while the surface film remains *tough, firm,* and *durable.* You cut costly surface preparations, you receive nearly 30% greater coverage depending upon the condition and porosity of the surface—and you receive the *maximum* in over-the-years protection!

Whatever your color choice may be—Rust-Oleum finish coatings include the color you want. They're manufactured under the same *exclusive* formulation as the Rust-Oleum Primer . . . they assure you of *greater* compatibility, *double* protection, and *lasting* beauty! The best way to see what Rust-Oleum will do for you is to actually try it yourself . . . around your plant or home.

See our complete catalog in Sweets, or send the coupon for a free Rust-Oleum Test Sample . . . one brushful means *more* than a thousand words. Prompt delivery from Industrial Distributor stocks.

*As proved by Battelle Memorial Institute Technologists in radioactive tracing studies.

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PNEUMATIC TRANSMISSION

Pneumatics simplifies and improves centralized control of Air Conditioning—makes Control Centers easier to understand and operate

With pneumatic transmission by Johnson you get the benefits of control center instrumentation that is as simple and trouble-free as the pneumatic controls used elsewhere in the building!

Thanks to universal familiarity with pneumatic controls, operating personnel easily become expert in the operation of even the largest pneumatic control centers. No highly specialized training or extensive study is required.

Since pneumatic transmission functions with both fewer and simpler components, there are no complex, costly upkeep problems.

CONTINUOUS INDICATION

Pneumatic transmission offers other exclusive advantages that add greatly to ease of operation and efficiency of centralized control.

For example, only the pneumatic control center gives the operator *continuous* indication of key temperatures. With a separate pneumatic thermometer for each key point, he can check the entire system with a single glance. There are no buttons to push, no waiting for periodic logging, no codes to check.

NO SIDE EFFECTS

Likewise exclusive are control pressure gages that allow the operator to observe the operation and position of controlled devices at remote points. And, of course, only pneumatic systems are immune to the effects of humidities, temperatures, transient electrical currents, voltage fluctuations and other outside variables. This assures the extreme accuracy necessary for continuous, precision control.

CHOICE OF FEATURES

The use of pneumatic transmission for the centralized control of air conditioning and heating systems allows complete flexibility in the choice of control features. The Johnson line includes a wide selection of remote indicating, recording and controlling instruments, some of which are shown on the opposite page.

Pneumatic transmission as applied by Johnson offers you the same exclusive combination of accuracy, simplicity and superior performance that have long made pneumatic temperature control systems the standard everywhere. A nearby Johnson engineer will gladly give you more facts about these and other advantages of pneumatic control centers.

Johnson offers you Control Center instrumentation to meet the exact requirements of the individual installation

T-1210 Room Transmitter. Transmits space temperature to Control Center. Has highly sensitive, low-mass bi-metal measuring element. Temperature range is 50 F.

T-1220 Transmitter. Measures temperature in ducts, pipes, tanks, and other remote locations. Compensated, liquid filled measuring element. Ranges of 100 and 200 F available.

T-1270 Receiver Controller. Receives measurements from transmitter and either (1) controls directly, (2) resets remote submaster controllers or (3) acts as a remotely reset submaster to control as in (1) or (2).

T-1250 Pneumatic Thermometer. For remote indication of temperature as measured by transmitter. Available in a wide variety of sizes and ranges, with Fahrenheit or Centigrade scales.

G-201 Control Pressure Gage. Provides continuous remote indication of the operation of the controllers and position of controlled devices. An invaluable aid to operation.

S-222 Pneumatic Gradual Switch. Permits manual readjustment of the set point of remotely located instruments from the Control Center. Small, highly accurate, trouble-free.

Pneumatic Push-Button Switch. May be used to start and stop fans, pumps and other electrical devices or to position any control device or equipment requiring two-position manual switching.

T-1000 Recorder-Controller. Furnished with powerful, high-accuracy measuring elements for temperature, pressure or relative humidity control applications. One-pen and two-pen models available.

Target Gage. Used in conjuction with Pneumatic Push-Button Switches to indicate operation of electrical equipment. Equipped with high visibility red or green fluorescent segments.

Miniature Indicating Controller. Conserves space on panels without sacrificing quality of control. A wide variety of easy to read scales and charts are available.

Miniature Recorder-Controller. Plug-in type, completely interchangeable with Miniature Indicating Controllers. For temperature or pressure control applications.

T-1050 Indicating Controller. For temperature, pressure or relative humidity applications not requiring a chart record. Master and submaster models available.

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

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PHOTOGRAPHED UNDERWATER AT FLORIDA'S SILVER SPRINGS

Underwater is home for this motor!

New Louis Allis Immersible motor is built to operate in water, sewage, or liquid chemicals

The Immersible motor can be adapted to operate in any kind of liquid — fresh or salt water, sewage, chemicals, or abrasive industrial cutting oils. It's the ideal means to provide power in a vat or sump — at the bottom of a pool, lake, or ocean!

No matter how deep your setting, the Immersible motor provides close-coupled power — saves you the need for expensive jack-shafting, intermediate bearing supports between pump and a surface-mounted motor, and mounting structures.

The motor is oil-filled and sealed at the factory. Diaphragm breathers equalize internal and external pressure — eliminate pressure at the shaft seal and prevent leakage. All joints are sealed to keep water and dirt out. Vinyl-coated housing and stainless or suitably plated exposed parts resist corrosion. Mating surfaces of the housing and flange are precisely machined to provide accurate alignment of the pump impeller and casing.

The Immersible, as shipped, is ready for horizontal or vertical mounting on pumps, agitators, mixers, or special equipment. Sizes range from ¾ to 40 hp. For additional information contact your local Louis Allis District Office, or write for Bulletin 2300, The Louis Allis Co., 432 E. Stewart Street, Milwaukee 1, Wisconsin. But do it today!

SM-109

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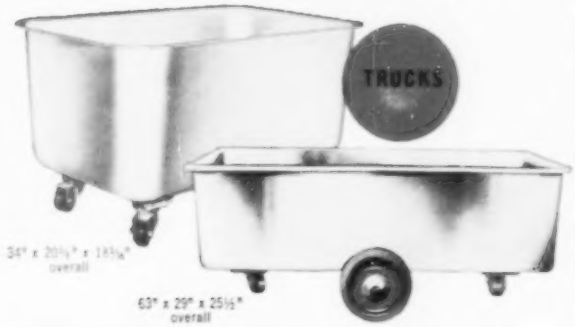
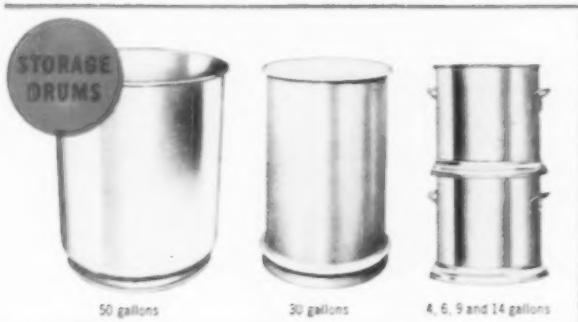
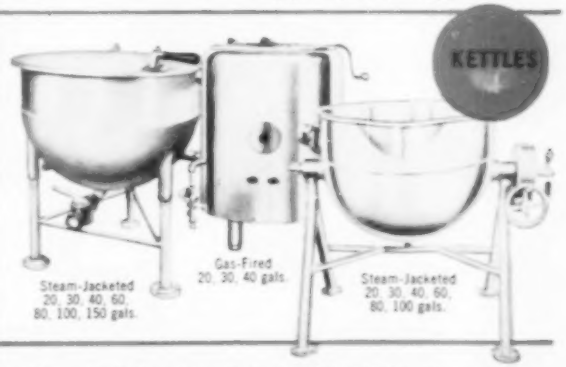
MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

World's Leading Supplier of Top-Quality Aluminum
Plant Service Items for Production, Handling, Storage

WEAR·EVER ALUMINUM







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world's largest family of valves*

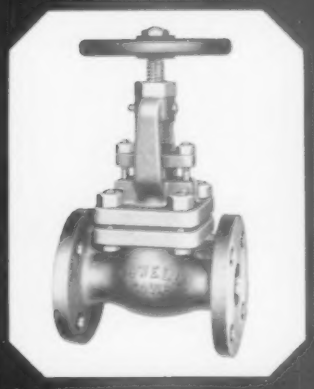

Fig. 2475 — Stainless Steel Globe Valve for 150 pounds W. P. Outside screw rising stem and yoke, bolted flanged bonnet. All dimensions conform to latest standards. This design is also available with screwed ends or socket welding ends.

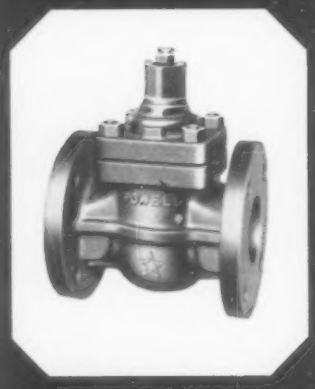

Fig. 2201 — Semi-steel, flanged end Lubricated Plug Valve for 175 pounds W. O. G. Single gland type. This design can be furnished with screwed ends. Sizes 1" to 4". Other types, larger sizes, higher pressure and gear operated valves are available.

Fig. 1821 — Bronze 125-pound Solder Joint Gate Valve for use with copper pipe or tubing. Screwed-in bonnet, inside screw rising stem. Interchangeable solid or split wedge discs. Inside screw non-rising stem valves can be supplied.

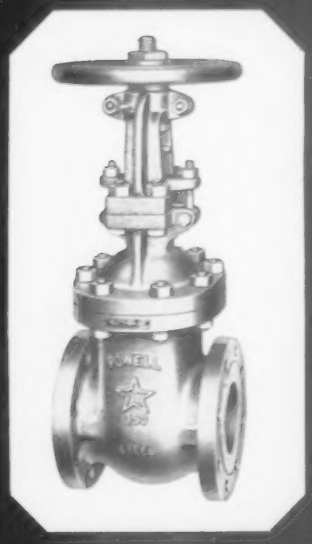

Fig. 1503—Steel Gate Valve for 150 pounds. Outside screw rising stem. Heavily bolted bonnet and yoke. Precision fitted, accurately guided solid wedge disc. Valves with welding ends can also be supplied.

Fig. 2600 — New 150-pound Bronze Full Flow Globe Valve. 500 Brinell hardened, stainless seat ring and disc. Nominal pipe size seat opening and extra high lift of disc assure full flow with minimum pressure drop and turbulence. Can be supplied with indicator collar and arm for visual control. 200 and 300 pound valves also available.

Fig. 2608 — High grade Bronze Globe Valve for 200 W. P. 500 Brinell stainless steel seat ring and disc. Nominal pipe size opening through seat and extra high lift of the disc assure fuller flow with minimum pressure drop and turbulence. Available for 150 and 300 pounds.

*and in this family there's a valve for every flow control requirement—for handling water, oil, gas, air, steam and corrosive fluids—available in the most required sizes and types. If your local distributor can't supply you, or if you need specially engineered valves for unusual conditions, write

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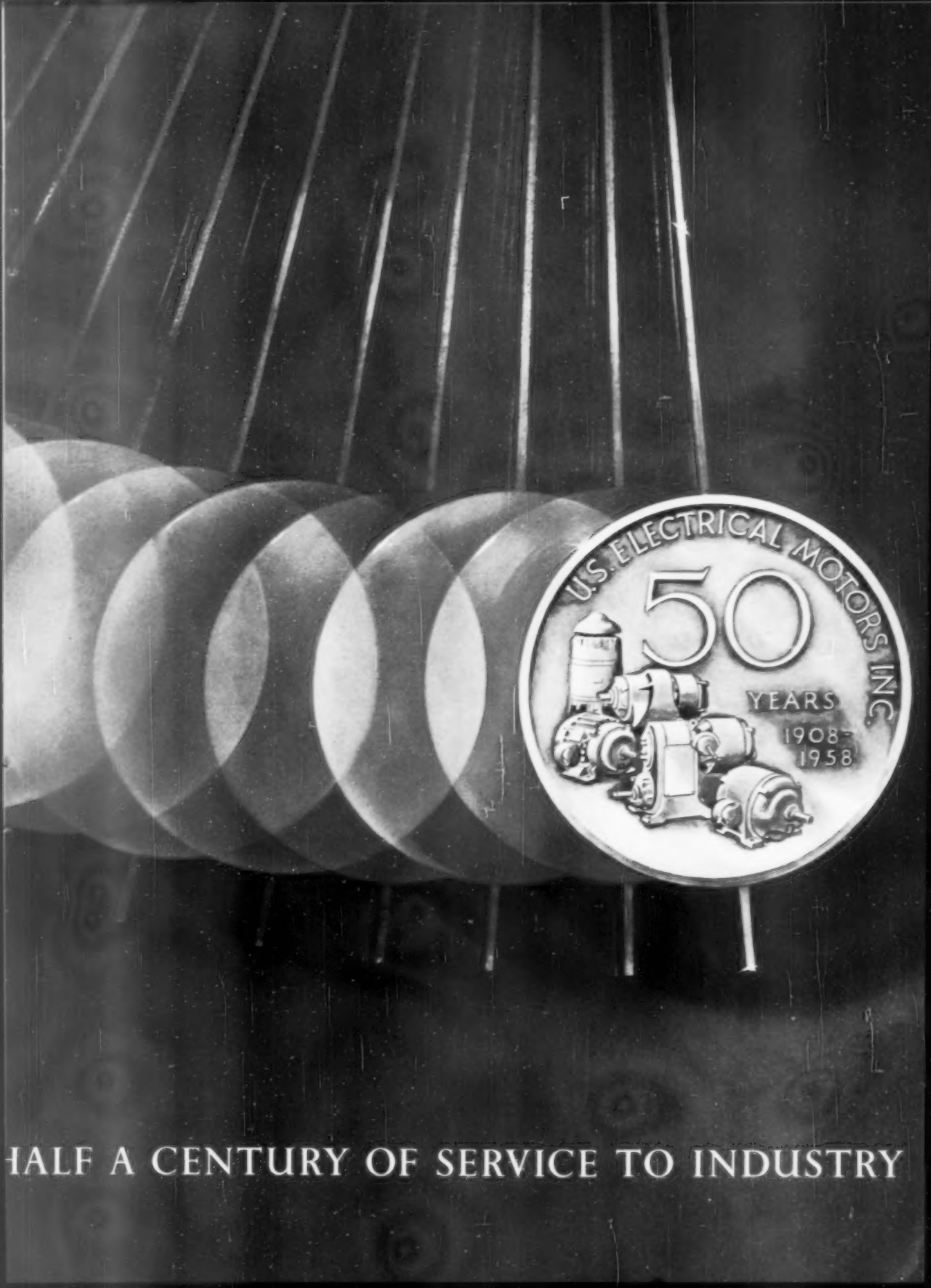
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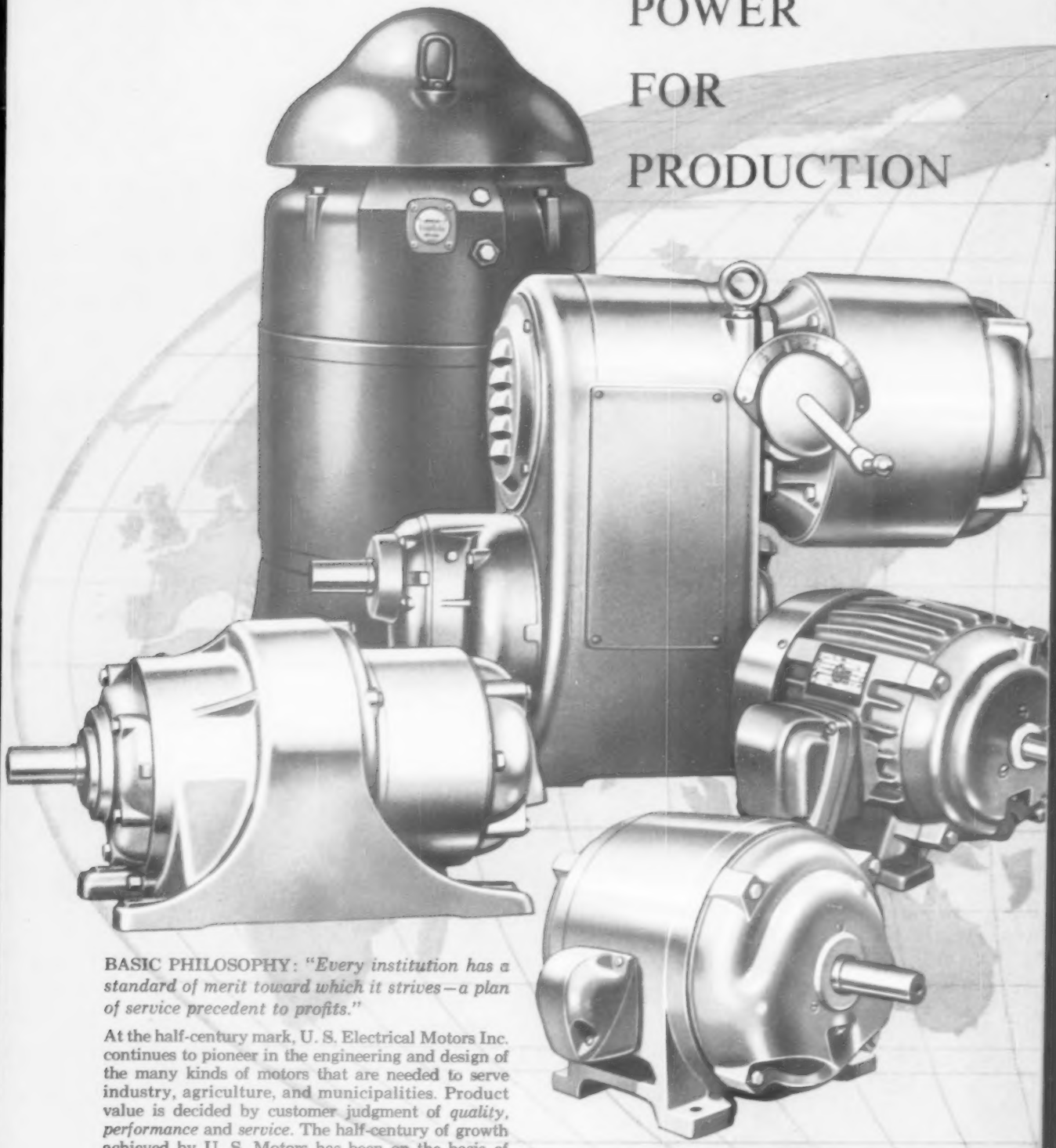

BASIC PHILOSOPHY: *"Every institution has a standard of merit toward which it strives—a plan of service precedent to profits."*

At the half-century mark, U. S. Electrical Motors Inc. continues to pioneer in the engineering and design of the many kinds of motors that are needed to serve industry, agriculture, and municipalities. Product value is decided by customer judgment of *quality, performance* and *service*. The half-century of growth achieved by U. S. Motors has been on the basis of that judgment by its customers.

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See your AIM*. . .Tilo Roofing does . . .

Steel strapping guards siding finish

Bundles of Tilo colored asbestos siding were coming loose during shipment, fanning and shuffling the sheets and damaging the finish. So Tilo Roofing of Stratford, Conn., called in their Acme Idea Man. He suggested using Acme Steel Strapping and an F-1 push-button strapping machine (Idea No. S2-16).

Acme Idea Man A. J. Payne has solved a variety of materials handling problems for many companies including Tilo.

The F-1 easily handles about 1700 bundles per eight hour shift—it automatically tensions each strap, spot welds the ends together, cuts it without waste, and the predetermined strap tension is always uniform. Now the asbestos sheets no longer fan and shuffle, finish stays perfect, and bundles reach the job site tight and secure.

And as Tilo's production increases, the F-1 has capacity for twice the job it is now required to do.

***See your Acme Idea Man** for suggestions on how to end your packaging and materials handling problems. His experience and his Ideas have saved time and money for thousands of companies. Call or write: Dept. FAS-68, Acme Steel Products Division, Acme Steel Company, Chicago 27, Ill. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL STEEL STRAPPING

◄ For more facts circle 484 on Reader Service Card

For more facts circle 486 on Reader Service Card

No doubt about it! Clean, attractive dress-wash-and-change facilities built around the advantages of Republic Steel Lockers are a decided employee benefit. A low-cost benefit. One that pays off for management in terms of high employee morale and a company reputation as "a good place to work, a good place to stay".

Republic Steel Lockers help employees start their day and end their day with a good feeling about the company. These high quality lockers just plain look better! They resist surface damage and unsightly rust because they're Bonderized, then finished with long-lasting baked enamel. Incidentally, modern locker rooms needn't be drab. Republic offers a choice of lighter, brighter locker colors.

Interiors are spacious, well-designed for convenience and good ventilation. Hooks and hardware are the best obtainable. Positive locking and heavy-duty hinges assure complete protection for personal effects and tools. No need to worry about pilferage.

No better time than now to plan new or expanded dress-wash-and-change facilities around Republic Steel Lockers. Republic's Berger Division has been in the locker business for a long time. Berger knows how to build the locker quality you want, and deliver it at a competitive price. Berger will help plan your locker grouping and handle all installation details.

Superior locker facilities are a "fringe benefit" that benefits the boss. Check your phone book for your Berger representative, or send coupon for facts.

YOU NEED IT, WE'LL MAKE IT. This special storage unit was designed and manufactured by Republic's Berger Division. Here, the customer wanted easy-to-use, easy-to-adjust sliding shelves to accommodate a multiplicity of can sizes. Berger's Special Products Department took over the problem, came up with the solution. Berger is geared to design, fabricate, finish and package all types of multi-run sheet steel products. Through its contract manufacturing facilities and equipment, Berger can take the whole job off your hands. Send coupon for facts.

SAVE SPACE, SIMPLIFY PALLETIZING AND STACKING. The savings of palletized handling now can be applied to bulky, uneven, odd-lot and fragile materials. Republic Pallet Racks make palletizing practical. Tubular steel supports adjust every six inches to handle palletized materials of any height. Two-way entry permits loading and unloading from either side. You select single pallets from any level without restacking. Send coupon for complete description, specifications, and quotations.

REPUBLIC WEDGE-LOCK STEEL SHELVING FOR SPACE-SAVING HIGH STACKING. Wedge-Lock is the world's strongest shelving. None more versatile. Wedge-Lock's great strength allows unusually high stacking. Secret is in the exclusive sway-proof joint that actually becomes tighter as the load increases. Wedge-Lock includes the three essentials of good steel shelving: a post that will not buckle, a reinforced shelf that does not sag, a concealed sway-proof joint. Berger storage engineers will help you design your installation. Send coupon.

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For more facts circle 487 on Reader Service Card

For more facts circle 488 on Reader Service Card➤

NEW FORK-LIFT CHAMP...

Automatic Transporter Stacker

with 83″ mast, lifts 135″... offers rider-type versatility at walkie-type cost

Transporter Stacker, Model WST, offers more advantages than any comparable truck. Included are highest lift, 135″ with 83″ mast...fast lift for speedier stacking...twin-ram tilt to prevent racking of mast...short overall length for easy maneuvering...heavy duty Class-H Silicone insulated motors available on all models.

This truck performs all the functions of a rider-type machine at considerably lower initial cost. More maneuverable, too; steering handle can be turned up to 200° to work in cramped quarters. Light weight permits operation in trailers, in elevators, and on floors considered unsafe for heavier trucks.

Versatility and efficiency can also be greatly increased by using a special attachment for any job with unusual loading, unloading or stacking requirements. This sometimes permits one truck to serve where two or more would be required otherwise. Three of the more popular attachments are shown below but all standard types can be accommodated.

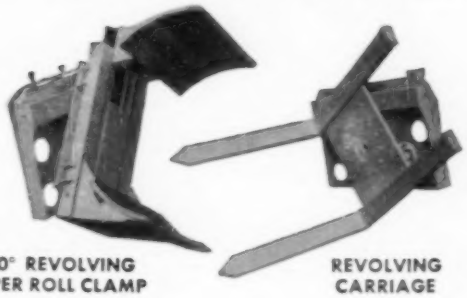
Capacities 1000 to 4000 lbs. for 48″ long load...Convenient lease and budget plans available. Example: 2000 lb. Stacker with battery and charger can be leased for as low as 40.6 cents* per hour. Let us show you how this truck can fit into your handling program. No obligation, of course. Just fill out the coupon and mail it to us today.

*Based on Model WS with battery and charger, working on 8-hour day, 255 days per year.

Transporters can be equipped with all standard attachments

CLASS "H" SILICONE INSULATED DRIVE MOTOR

Automatic is the only industrial truck manufacturer that has available Class "H" Silicone insulated motors for all "Walkie" models. These motors are immune to burnouts and overload failures even at 300° to 400°F.



360° REVOLVING PAPER ROLL CLAMP **REVOLVING CARRIAGE**

PLATFORM ATTACHMENT

Back plate drops onto forks making a platform for maintenance jobs, order picking, etc.

Ⓐ Lift and lowering control is operated from platform.

Automatic *Electric Industrial Trucks Cost Less to Own...Less to Operate*

AUTOMATIC TRANSPORTATION COMPANY

Division of The Yale & Towne Manufacturing Company

39 West 87th Street, Dept. H-8, Chicago 20, Illinois

WORLD'S LARGEST EXCLUSIVE BUILDERS OF ELECTRIC-DRIVEN INDUSTRIAL TRUCKS

Electric Automatic Industrial Trucks

AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale & Towne Manufacturing Company
39 West 87th Street, Dept. H-8, Chicago 20, Illinois

Please mail me the following:
- ☐ Model WST illustrated specifications
- ☐ Full details of lease and budget-purchase plans

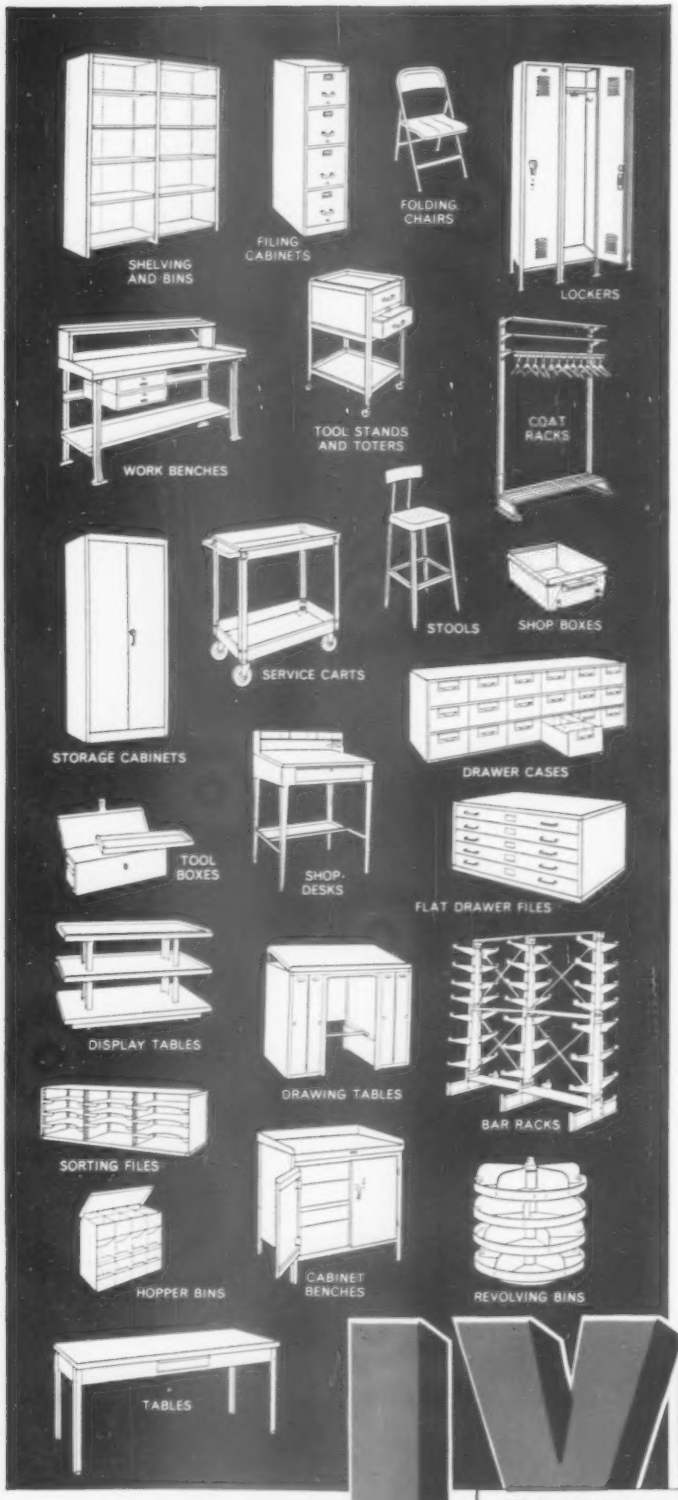
Your Name.....Title.....

Firm.....

Address.....

City & Zone.....State.....

Newly designed



FIRST
IN QUALITY DESIGN

FIRST
IN BUYER PREFERENCE VOTED 5 TO 1

FIRST
IN RANGE OF PRODUCTS MORE THAN 1500 ITEMS

FIRST
IN LOCAL DEALER SERVICE

See Your LYON Dealer!

He's as near to you as your phone. He offers the world's most diversified line of steel equipment. Equally important, he can show you how to get the most for your money in saved time and space.

LYON METAL PRODUCTS, INC.

General Offices: 612 Monroe Ave., Aurora, Ill
Factories in Aurora, Ill. and York, Pa.
Dealers and Branches in All Principal Cities

Lyon also has complete facilities for manufacturing special items to your specifications

OVER 1500 ITEMS
for Business, Industry, Institutions

LYON®
STEEL EQUIPMENT

For more facts circle 489 on Reader Service Card

Newly designed

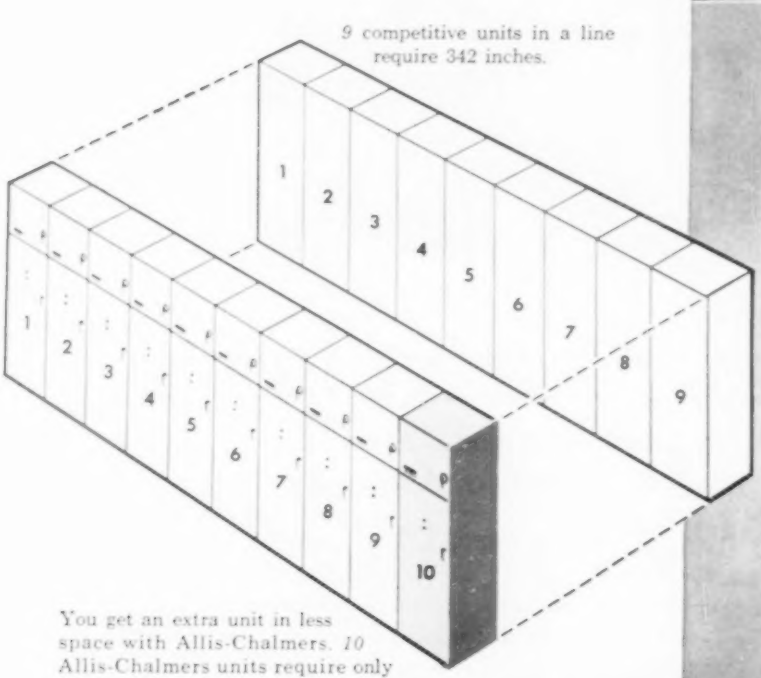
Type H Motor Control

Saves valuable plant space

Newly designed Allis-Chalmers high voltage control units are only 34 inches wide. This means you can put 10 Allis-Chalmers cabinets in less space than required by 9 competitive 38-inch units. In addition, the narrower width means less space required for door swing. Result: You save a total of 2.36 sq ft of floor space per unit. On 10 units, this means a saving of 23.6 sq ft.

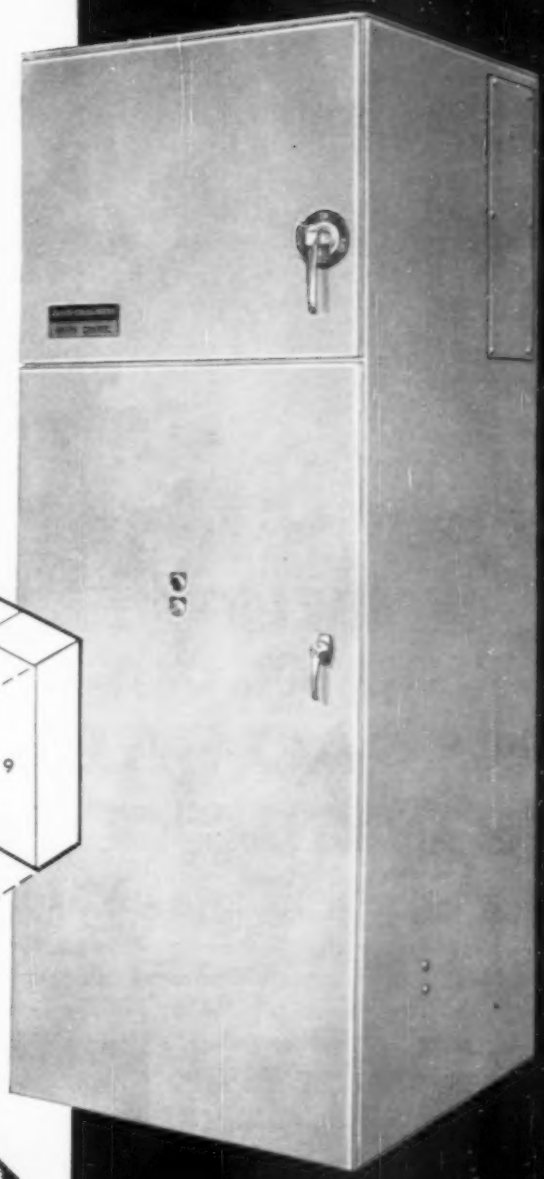
Smaller size is only one of many advantages in this new Allis-Chalmers design. You also get full-front access, more room for optional features, a completely tested unit, and the ultimate in protection for men and machines.

For more information on how this new control design can help you, call your nearest Allis-Chalmers representative, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



9 competitive units in a line require 342 inches.

You get an extra unit in less space with Allis-Chalmers. *10* Allis-Chalmers units require only 340 inches.



ALLIS-CHALMERS

A-5518

For more facts circle 490 on Reader Service Card

FOR IMPACT PROTECTION . . .

Our newest spectacle type safety glasses — combining maximum safety with wearer appeal. Yes, they're as good as they look — with true safety frames and true safety lenses. A typically engineered (and exclusive) AO feature is the patented eyewire which is made with a deep groove to hold lenses safely on impact. Other features include 2 tone onyx on clear crystal plastic frame . . . matching spatula or comfort cable temples . . . 6 Curve Super Armorplate Clear or Calobar lenses.

AO 2-TONE ULTRASCOPIC SAFETY GLASSES

FOR SPLASH, SPRAY AND IMPACT EXPOSURES . . .

This new goggle is particularly recommended for use in the chemical industry and in humid operations. Indirectly ventilated for splash-resistant safety yet twice as fog-free as similar goggles. Lightweight, comfortable, with wide angle vision, it fits over all types of personal and safety Rx glasses. Acetate lenses conform to high safety and optical standards.

AO 710 SPLASH GOGGLE

In Plant after Plant . . .

AO SAFETY GLASSES

like these Save Workers' Eyes and Thousands of Dollars Annually

If you're searching for every possible way to cut needless costs — consider an American Optical Eye Protection Program. It works! One metalworking company saved 119 eyes and $615,000 the past five years . . . another cut lost production time in hours from $3.36 per employee to $.23 in 1½ years . . . another saved 38 eyes and $328,000 the past seven years. For complete details about an eye protection program, write us direct or call your nearest AO Safety Representative.

Always insist on Trademarked lenses and frames

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts
Branches in Principal Cities

1833-1958 • 125 LEADERSHIP YEARS

For more facts circle 491 on Reader Service Card

Just off the Press!

SEND FOR YOUR COPY

of this 48 page Application Booklet for
SEPARATION, MAGNAMATION and VIBRATION EQUIPMENT!

48 PAGES!

Big new comprehensive booklet shows complete line of Eriez non-electric magnetic equipment including newly-developed units for separation, vibration and automation needs.

Here it is! . . . Eriez' fascinating, fact-filled booklet that shows how permanent magnetic separators are being used in processing lines of all types to remove tramp iron before it can cause machinery damage and downtime, fires or product contamination.

The booklet, packed with photographs, illustrates most of the major types of Eriez permanent magnets and the many and varied ways they can be used to separate, retrieve and purify ferrous from non ferrous materials. In addition, you'll discover other applications of Eriez equipment—from Magnamation units that convey, control and elevate all types of metal parts to electro-permanent magnetic vibratory feeders that accurately and automatically move tons of material each hour. You'll find that separation or materials handling problem of yours inside—and see how Eriez Separation, Magnamation or Vibration Equipment can solve it!

Eriez, leader in design and research of magnetic equipment, introduced most of the types of permanent, non-electric magnetic units on the market today. Specifically, we build standard lines of magnetic separation equipment and in addition, design and build special Magnamation components to magnetically convey, transfer, control, elevate, re-position, hold or re-orient basic ferrous materials or finished parts.

Our laboratory and field staffs, backed by the know how and versatility of solving countless magnetic problems of all types, are among the most skilled in this line. They are continually developing and perfecting new models to meet the ever changing needs of industry. By studying your particular problem, they will recommend the *lowest cost* magnet in *proper size and strength* to do the job best.

Whatever your product—and whatever your magnetic problem—you'll find the answer in this handy booklet "Magnetic Ideas from Eriez". Send for your copy today.

CLIP IT, MAIL IT!

ERIEZ HI-POWR MAGNETIC SEPARATORS

ERIEZ MANUFACTURING COMPANY
70F Magnet Drive
Erie, Pa.

Please send a copy of your booklet to:

NAME _____

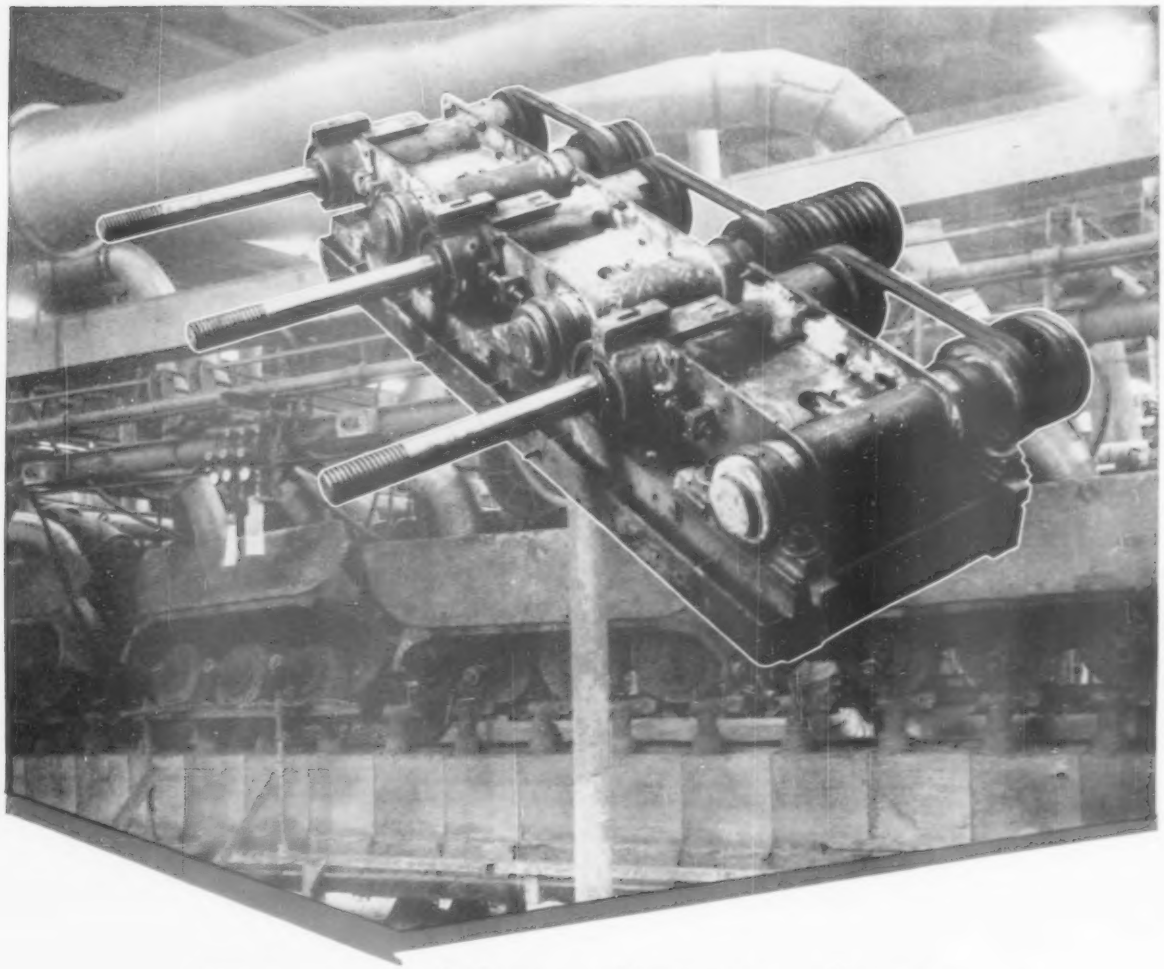
COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Specialists in SEPARATION • MAGNAMATION • VIBRATION

For more facts circle 492 on Reader Service Card



Here's a Bearings, Inc. idea that saved our customer $3,000 in labor, maintenance and parts in 7 months

Only an authorized bearing distributor such as Bearings, Inc., with the experience and facilities we have at our disposal, could have designed and supplied the special housings that hold the flinger sealed bearings that now have effectively solved this difficult bearing maintenance problem.

A well known automotive stamping plant designed and built this tandem buffing head (shown above) for its own use. Due to the extremely high concentration of metal dust from the buffing and polishing wheels conventional bearings had a very short life. Over 300 bearings were purchased in 7 months. Downtime due to bearing failure was very costly. The actual labor and material cost of replacing the bearings during this period exceeded $3,000! Since the new bearing units designed by Bearings, Inc. (shown enlarged) were installed, no bearing failures have occurred and no replacements have been installed.

Remember Bearings, Inc. when you need replacement bearings — Get "factory fresh" bearings of latest design and manufacture. We are *authorized* to sell most famous makes of bearings. We sell *only* those we are authorized to distribute. Call the Bearings, Inc. branch nearest you!

Providing bearing service in the North ▸ **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden
NEW YORK: Buffalo, Balanrol Corp. • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

and in the South ▸ **DIXIE BEARINGS, INC.**

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville

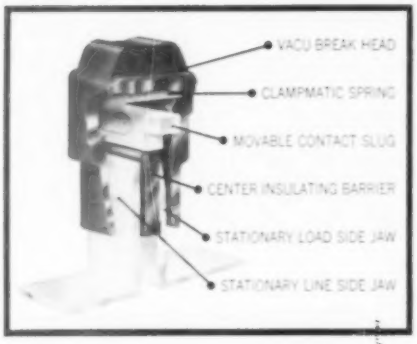
For more facts circle 493 on Reader Service Card

Safest switches known

—in every size from 30 to 1200 amps

Large or small, BullDog Clampmatic® Vacu-Break® Safety Switches provide *maximum* protection . . . meet your every switching need. You get added safety because of these two exclusives: The unique Clampmatic spring increases the pressure against contact jaws . . . assures clamp-tight connections . . . faster break . . . *really safe operation*. Vacu-Break action snuffs arcs immediately . . . reduces pitting and burning of contacts for long, trouble-free switch life.

BullDog's "Big Three" safety switches, The "Master", "Junior" and "Raintight", assure positive switching for every application. For this added safety, see a BullDog field engineer for complete details, or write BullDog Electric Products Company, Detroit 12, Mich.



CLAMPMATIC VACU-BREAK — BullDog's unique Clampmatic spring clamps the contact slug between the line and load jaws. Constant pressure permits cool operating contacts. As the switch moves to "off", the spring accelerates the break. Vacu-Break action snuffs arcs immediately...minimizes damage to contacts.

© BEPCO

BULLDOG

BullDog Electric Products Company, Division of I-T-E Circuit Breaker Company, Detroit 32, Mich. *BullDog Export Division*: 13 East 40th St., New York 16, N.Y. *In Canada*: BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Rd., Toronto 15, Ont.

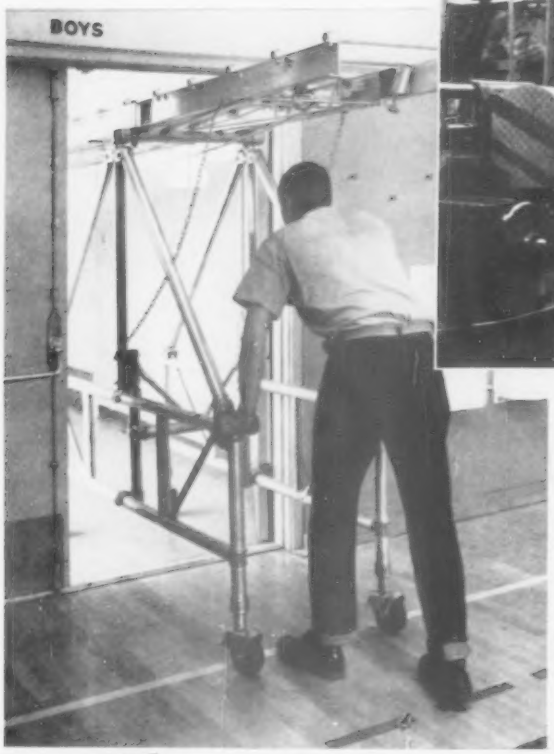
HEAT BETTER ELECTRICALLY

For more facts circle 494 on Reader Service Card

UP-RIGHT ANNOUNCES

TALLESCOPE ...telescoping aluminum work platform for overhead spot maintenance

Lightweight, rapidly assembled by one man. Extends instantly for reaching heights up to 30 ft. Adjustable legs for uneven floors or stairways. Only 29" wide for rolling through congested areas.



Telescopes and folds down to roll through doorways, under trusses, pipes and conveyors.

Separates easily into 3 components for convenient storage or transportation.

FOR TALLESCOPE CIRCULAR
WRITE TO
UP-RIGHT SCAFFOLDS
DEPT. 178 • 1013 PARDEE ST., BERKELEY, CALIF.

MANUFACTURED BY
UP-RIGHT SCAFFOLDS

GOLDEN SILENCE

Only ARO AIR TOOLS have it!

- ***NO NOISE—listen!***
- ***NO LOST POWER—try it!***
- ***NO BLAST—feel it!***

Golden Silence models offer a new dimension in air tool performance! Screwdrivers, drills, nutsetters, tappers. For a demonstration see your ARO Distributor.

THE ARO EQUIPMENT CORPORATION • Bryan, Ohio
Aro Equipment of Canada, Ltd., Toronto 15, Ont.
Offices in All Principal Cities

ARO ®

AIR TOOLS

Also Air Hoists . . . Automation Tools . . . Paint Pumps . . . Material Handling Pumps . . . Industrial Lube Equipment

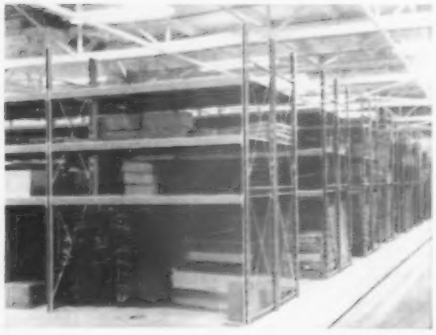
For more facts circle 496 on Reader Service Card

They'll do it! They'll do it EVERY time!

American

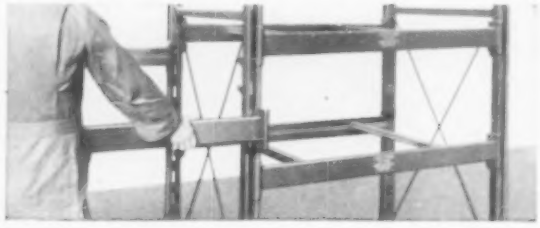
Slide-n-Lock adjustable

(Model SL-2) STORAGE RACKS will cut your material handling costs!

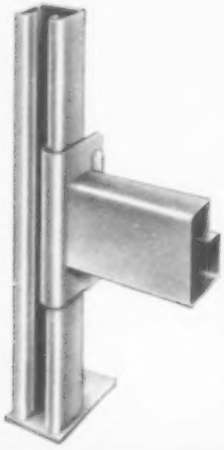


raises and lowers like a window

NO BOLTS NO WELDING IMMEDIATE DELIVERY



send for catalog!



View on left shows the smooth line construction of the aisle side of post and stringer. There are no protruding edges to create hazards. View on right shows the rigid connection when the stringer is "locked" to the post. Both views show the "L" shaped tubing (no open seams—it is a one-piece, continuous welded tube).

over 800 different sizes and capacities from 5 basic parts

AMERICAN METAL PRODUCTS COMPANY

STORAGE RACK DIVISION

5959 LINSDALE AVENUE amp DETROIT 4, MICHIGAN

For more facts circle 497 on Reader Service Card

For more facts circle 498 on Reader Service Card ➤

You find Gates Hose where anything flows

St. Lawrence Seaway — one of the biggest construction jobs in the world — employs thousands of feet of Gates Type 19B Hose. Shown here is Long Sault Dam.

(PHOTO COURTESY NEW YORK POWER AUTHORITY.)

Industry has in use today more than 4000 MILES of *Type 19B** Gates Hose

...and industry all over the world uses equally impressive amounts of the air, water, steam, suction and many other hoses in the full range of types and sizes made by Gates.

Back of this world-wide acceptance is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

It is the aim of this *specialized* research to increase hose utility and life, and to lower industry's annual hose costs.

Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States, and in 90 countries throughout the world...and its outstanding performance is guaranteed by the **World's Largest Maker of V-Belts.**

***Gates Type 19B Hose** carries air, water, coolants, oils, greases, gasoline, kerosene, or solvents. This popular hose—one of many in Gates full line—is always available from your nearby Gates Distributor.*

The Mark of *Specialized* Research **The Gates Rubber Company • Denver, Colorado**

TPA 335

Gates Industrial Hose

Made in a Full Range of Types and Sizes

"Steel inventory problems? Ryerson solved them..."

You can pass your steel inventory problems on to Ryerson, too. When Ryerson carries your steel inventory, you profit several ways. You reduce your "cost-of-possession" factor . . . increase your material selection flexibility . . . and assure a ready, steady flow of material to meet production needs.

Ryerson will help you plan inventories of such materials as carbon, alloy and stainless steels . . . bars, structurals, plates, sheets and tubing . . . aluminum and industrial plastics. With Ryerson as your source, you store and handle only a safe minimum of material to meet your needs.

With Ryerson inventory control you can make design changes or revise production, with less inventory risk. Ryerson—with strategically located plants and unlimited stocks—stands ready to deliver the exact steel you require when you need it.

A call to the nearby Ryerson plant will bring you the profitable details on how Ryerson can help you with steel inventory problems.

RYERSON CERTIFIED QUALITY

RYERSON STEEL®

Member of the IPSCO Steel Family

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metal-working machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

FACTORY
MANAGEMENT AND MAINTENANCE
. . . PRESS TIME REPORT • JUNE 1958

Looking Ahead in Business

To cut personal income taxes—or not to cut. That's still the big question Congress must make up its mind about before the summer recess.

There's no ducking the question, because some $3-billion of corporate and excise taxes expire July 1 and the tax laws must be rewritten to (1) maintain present rates; (2) cut a few especially tempting ones, like excises on cars or the lowest bracket of personal income taxes; or (3) cut income taxes generally.

So far the Administration has been standoffish on a tax cut. Government spending is up, revenue down. And Treasury experts see an $8- to $10-billion deficit for the fiscal year ahead. The Administration doesn't want to recommend more red ink, especially if the economy can manage an upturn without a tax cut.

•

Some of the key indicators do point to a pick-up—or at least a bottoming out—of the business decline:

Personal income has risen in the last two months. April was only 1.3% below 1957's peak. Wages and salaries declined—but at slower rate. And this was more than offset by social security and unemployment payments. Farm income has been strong.

Retail sales perked up 2% in April. A good share of the rise was due to higher food prices. Big losers were automotive sales, which have been running some $1.5-billion behind last year.

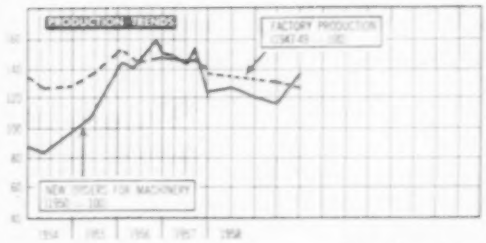
Housing starts inched up to a 950,000 rate. This followed a slow beginning in '58. The spurt in new applications for FHA and VA financing has been spectacular—thanks largely to the new housing act.

•

The 1958 housing act is one of the strongest anti-recession moves Congress has taken. It provides for lower down payments on new homes, increases the size of mortgages covered by FHA, hikes the interest rate on VA loans, and puts up a tidy sum for purchase of mortgages on low-priced housing.

All this should mean a strong surge in homebuilding by late '58. Remember, housing has had its own private recession, which lasted two years.

FACTORY FIGURES OF THE MONTH



Indicator	Apr. 1958	Mar. 1958	Apr. 1957
New Orders for Machinery (exc. elec.)[1]	139.0[p]	119.0	142.0
Contracts for Industrial Construction[2]	79.0	89.0	122.0
Factory Production[3]	128.0	130.0[r]	145.0
Consumers' Prices (cost of living)[4]	123.5[e]	123.3	119.3
Industrial Prices (materials, supplies)[4]	125.6	125.7	125.4
Manufacturing Employment (millions)[4]	15.1	15.4	17.0
Total Employment (millions)[5]	62.9	62.3	64.3
Unemployment (millions)[5]	5.1	5.2	2.7

p = preliminary r = revised e = estimate

Sources: 1. McGraw-Hill Dept. of Economics (1950=100); 2. Engineering News-Record (1950=100); 3. U. S. Federal Reserve Board (1947-49=100); 4. U. S. Dept. of Labor, Bureau of Labor Statistics (1947-49=100); 5. U. S. Dept. of Commerce, Bureau of the Census.

New heavy-equipment orders, after ranging the low 120's (McGraw-Hill Index), rose to 139 in April—aided mainly by new orders for engines, turbines, and mining and construction machinery.

Continued strength in new orders and industrial contracts would mean a leveling out in the sharp capital goods decline by late '58 or early '59.

•

Even so, the recession has gone deeper than was thought likely a few months ago. The slide now qualifies as the most serious of the three postwar recessions.

We have probably reached the low point, with at least a moderate recovery due in the second half of '58. But GNP (value of all goods and services) has slumped some $18-billion below last year's peak.

How fast the economy can make up these losses—and whether a tax cut is needed to insure recovery—are the questions Congress must face right away.

FACTORY
MANAGEMENT AND MAINTENANCE . . . PRESS TIME REPORT • JUNE 1958

Ideas of the Month

(For more information, circle item numbers on Reader Service Card next to back cover)

Salt tablets for hot weather? Of course. And preferably the new Pep-Up kind *(Safety Service Co.)* with vitamins B, B_2, and C added. **(313)**

"People and Paychecks" *(Standard Oil Co. of California)* is our candidate for booklet of the month. Designed to give a broad picture of pay policies, what they mean, how to put them into practice. Intended primarily for supervisors, to answer their own questions, and those of employees they supervise. **(314)**

Rev-Tuner is a pocket-size gadget *(DuMaurier Co.)* that measures motor speed. Just hold it in direct contact with the housing and read the score. **(315)**

Torque-limiting, calibrated screw driver *(Richmont, Inc.)* is the niftiest. Setting can be changed in moments with disappearing key recessed in handle. For production use, tool may be sealed at required torque setting. **(316)**

Only 16 square feet of floor space is needed for the new vertical-conveyor-type parts-washing machine *(Ransohoff, Inc.)* compared with 44 square feet occupied by a horizontal machine. **(317)**

Look, Ma, no hands! will never be said by punch press operators if machines are equipped with dual safety interlock switches *(Westinghouse)*. Impossible for operator or electrician buddy to fool the circuit. **(318)**

Pre-blued tool steel *(Brown & Sharpe)* is ready for marking and layout. Eliminates time-consuming bluing and drying. Full range of sizes. **(319)**

Maintenance check charts *(A. C. Horn Co.)* will be a big help in putting together a complete picture of *what* needs to be done *when*. **(320)**

Safety slogans are imprinted free on Ajax and Auro paper cups *(U. S. Envelope Co.)*. Just another way of getting your message across. **(321)**

Noisy plant? Maybe you'll want a couple of those little acoustical phone booths *(Eckel Corp.)*. Can be mounted on a bench or on a wall. **(322)**

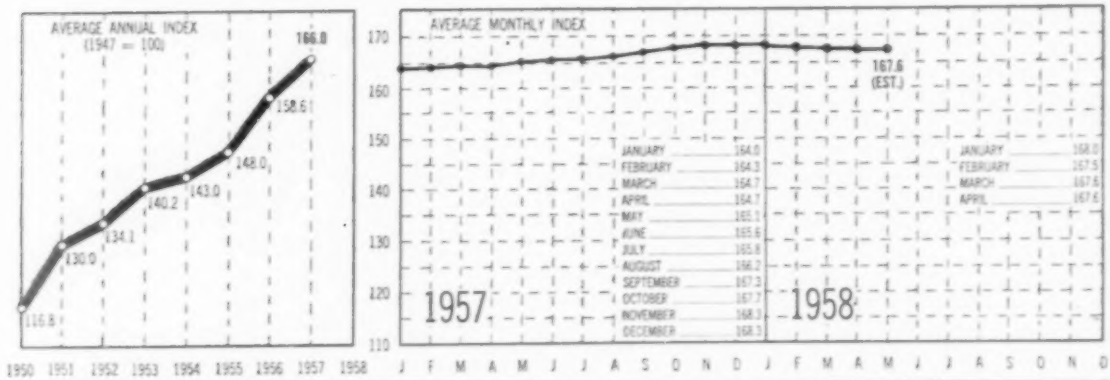
New lapping service *(Carbilap Co.)* will reclaim those carbide and ceramic inserts you've been throwing away—at half the cost of new tools. **(323)**

More Ideas of the Month on pages 88 and 89

FACTORY
MANAGEMENT AND MAINTENANCE

.. PRESS TIME REPORT • JUNE 1958

Cost Index of Plant Maintenance



Cost Index Holds Steady

Prices show little change despite recent large scale inventory liquidation.

FACTORY'S COST INDEX registered 167.6 in April, the same as in March and February.

How firmly the Index is fixed on dead center is indicated by the behavior of materials prices from March to April. Of the 39 items included in the Index, 25 remained unchanged, 8 rose, and only 6 fell.

Materials prices have declined somewhat during the recession, but at an extremely moderate rate. At the end of the third quarter last year the price index for all 39 items combined was 161.0. In April the figure was 159.9—a drop of less than 1%. In view of developments in the intervening two quarters, the barely perceptible downward movement seems almost uncanny. For in the fourth quarter of 1957 and first quarter of this year business engaged in one of the most vigorous drives on record to unload goods.

In the third quarter business was still accumulating inventory at a rate of $3-billion a year. In the first quarter of 1958 inventories were run off at an annual rate of $9-billion—a net reversal of $12-billion.

The economy recently has shown signs of bottoming out. This should spell the end of the inventory liquidation binge. Business may continue to run off inventory—but at a slower rate. This will mean increased demand for goods. Thus the days of gently falling goods prices may be numbered. For if prices decline hardly at all in a period of falling demand, they seem almost certain to turn up again when new orders pick up.

	AVERAGE 1957	APRIL (Preliminary)	MARCH (Revised)
Building and Facilities Index	**156.9**	**158.8**	**158.2**
Materials	140.6	137.4	137.3
Brick	147.8	148.6	148.6
Elec. fixtures	128.0	128.9	128.9
Elec. switches, boards, fuses	175.7	181.4	181.4
Elec. wire, copper	136.6	118.6	118.6
Glass	152.6	152.5	152.5
Gutters, spouts, ducts	169.4	170.1	170.1
Gypsum products	134.5	140.8	140.8
Heating equipment	128.2	127.2	127.0
Lumber	126.7	122.7	122.7
Millwork	147.1	146.2	146.2
Paint	128.1	130.2	130.2
Pipe, cast iron	165.8	170.4	170.4
Pipe, steel	188.1	190.1	190.1
Pipe & tubing, copper	156.0	146.2	146.2
Roofing	129.8	112.2	112.2
Sanitary fixtures	151.4	142.8	144.6
Sash, metal frame trim	145.7	152.1	148.0
Solder	121.2	114.7	118.6
Steel, structural	222.0	227.7	227.7
Tanks, steel	138.3	139.8	139.0
Valves & fittings	159.9	158.0	156.9
Wire mesh	166.9	159.8	158.5
Labor	167.7	173.1	172.1
Carpenters	154.6	159.1	157.1
Electricians	174.5	179.9	179.9
Painters	174.0	180.3	179.2
Equipment Index	**169.9**	**171.3**	**171.8**
Materials	167.7	169.5	170.3
Abrasives	154.1	160.4	160.4
Alloys, non-ferrous	127.2	112.9	114.7
Bars & plate, steel	214.8	220.9	220.9
Bearings	166.2	164.6	170.9
Belting	150.9	150.0	149.7
Bolts, nuts & screws	222.9	230.6	230.6
Chain	177.6	184.0	184.0
Controls (electrical)	175.7	181.4	181.4
Gear-reduction units	180.4	181.7	181.7
Hand tools, mechanics	185.1	192.3	192.3
Lubricants	87.8	83.7	84.4
Motors	143.5	146.6	145.4
Non-ferrous metals	133.3	114.4	119.4
Precision tools	150.2	153.2	153.2
Pumps	177.2	183.7	183.7
Tools, cutting	162.3	170.4	170.4
Valves & fittings	159.9	158.0	156.9
Labor	171.5	172.5	172.5
All mfg. labor	167.5	170.6	170.6
Machine tool labor	175.4	174.4	174.4
FACTORY'S COST INDEX	**166.0**	**167.6**	**167.6**

FACTORY
MANAGEMENT AND MAINTENANCE
...PRESS TIME REPORT • JUNE 1958

Looking Ahead in Labor

Union leaders are smarting at labor's sagging reputation—and working hard to reverse the downhill trend. This is a priority subject at AFL-CIO headquarters: What to do about the damaging effects of the investigation into labor corruption. Though most union officials aren't involved, the exposures of Dave Beck's dealings by the McClellan Senate committee are rubbing off on the whole labor movement.

Labor strategists privately admit this is hurting—badly. Unions are feeling the effects three ways:

...In organizing. Many employers are reminding workers what the McClellan committee is turning up.

...In public opinion. A damaging turn here.

...In Congress. Labor strategists see a chance of legislative curbs on union behavior, which so far has gone unchecked. New laws may not come this session. But they're around the corner.

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The men who chart labor's goals—AFL-CIO President Meany, United Auto Workers Chief Reuther, International Electrical Workers Chief Carey, and the rest—aren't missing these three points. They've done plenty of private thinking already—and have even taken private action in some areas.

Here's what union planners have come up with so far:

• **The AFL-CIO hired a private pollster (at a $35,000 fee) to survey the South for organizing potential.** Unions have failed in that area many times. The gist of the new survey indicates no difference today. While the survey favored certain approaches to a drive in the South, the nub of the report was that it's an impossible job in the current atmosphere, no matter how you try it.

• **As for the public, new tactics have been devised to change the labor image shaped in the past year.** Organizers on the AFL-CIO staff (and even some of its bigger international unions) are being freed for another kind of job—public speaking. They'll defend the labor movement and plug its successes. You'll see them at civic, church, and social meetings. These organizers, trained in approaching non-union members, have the spare time to do the job. They aren't attempting any membership drives.

• **The third strategic maneuver deals with the most immediate problem—Congress.** Union officials hope to hold off new labor legislation while labor recovers its reputation. With this in mind George Meany & Co. have worked out a new approach to Capitol Hill. When Congress last considered major restrictions on labor, union officials boycotted the subject. They offered no counter-proposals to Taft-Hartley in 1947. And the law was passed. This time they'll talk cooperation and, while they plan to resist most legislation, they hope the kid-glove approach will do better this time.

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These are hardly the rough-and-tumble tactics of the 30's. But the softness isn't due altogether to exposure of corruption in labor. It's due also to dimming aggressiveness over the past decade as raises came easy and labor and management were fairly comfortable at the bargaining table.

A new factor has been injected this year—an economic downturn. And where union leaders might normally want to show some muscle, they're hit by the racketeering label. These two factors have softened their position. And it's now showing up in the union selling campaign.

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Some real evidence of recession is showing up in the unions' own camp. Unemployment—about 6-million this month—has hit labor headquarters. With hundreds of thousands of members out of work the unions—especially industrial unions—are feeling the pinch in their own pocketbooks. Some of the giants are even in the red. When a worker isn't getting his paycheck he usually isn't paying dues, either.

The UAW, for instance, is showing an operating deficit of almost $500,000 a month this year. The Steelworkers aren't far behind. These economic facts resulted in a 10% pay cut for Reuther and other UAW officers. The Steelworkers' president, David McDonald, whose $50,000 salary is more than double Reuther's, has been holding the officers' pay line.

It's different in the craft unions. Craft union members try to keep up their dues so they'll be available for jobs.

SEE LABOR RELATIONS NEWS, PAGE 192

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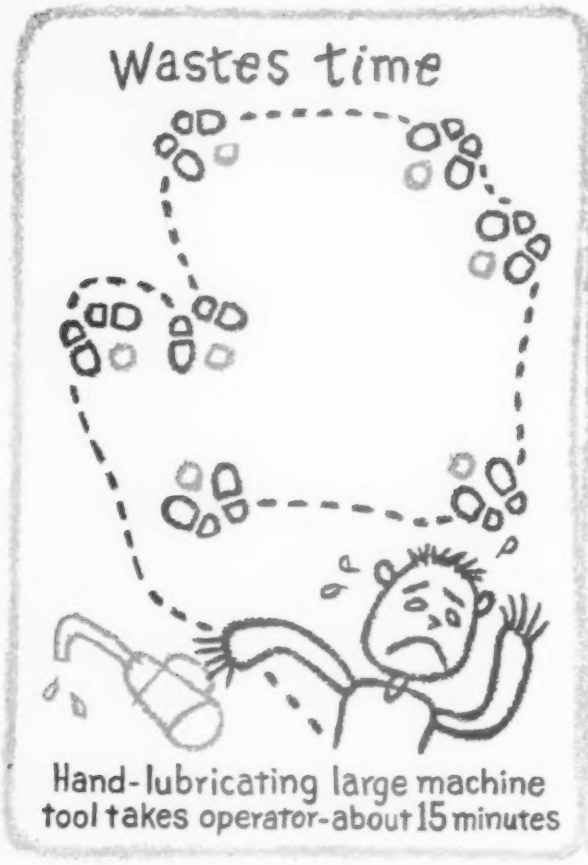

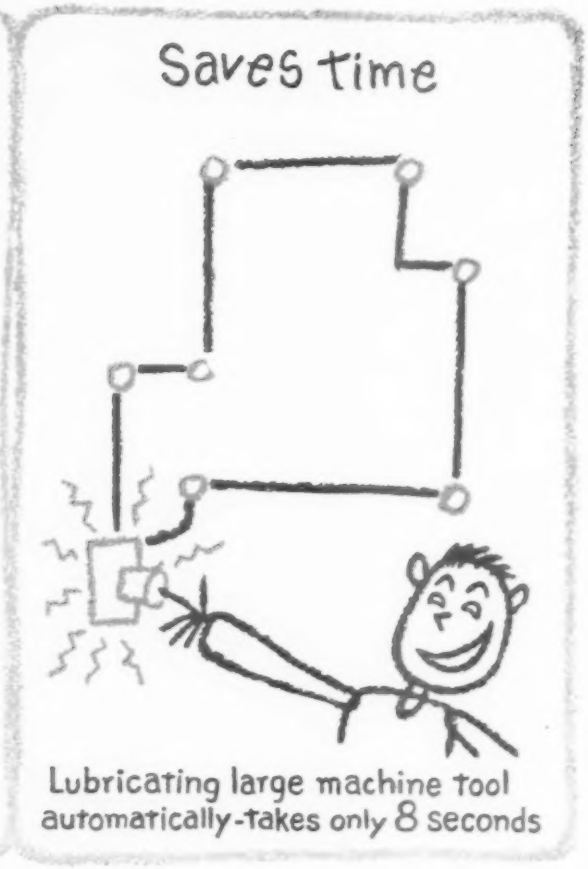

A large part of industry still relies on out-moded lubrication methods to maintain and protect its tremendous investment in expensive, high-speed, precision production equipment.

Economical operation of production equipment depends not only on the right lubricant, but also on the right amount in the right place at the right time.

Central lubrication cuts waste of manhours—in one case, 315 a month

Recent management surveys into plant lubrication practices have turned up some astounding opportunities for over-all savings. In a single plant these savings included a 60% reduction in maintenance expense and a 20% increase in production.

This particular study covered 60 machine tools performing turning, boring, drilling and reaming operations. Each operator lubricated his own machine with a hand gun and was allowed fifteen minutes per eight hour shift to do so—a total of 315 manhours.

But for one reason or another (neglect; new, untrained operators; misplaced or lost guns; no grease on hand, fittings damaged or missing) at least some of the twenty-one lubricating points on every machine were either improperly lubricated or had not been lubricated for a long time. These conditions were corrected by installing a central system on each machine, enabling the operator to spend all his time on productive work. Result—tremendous savings and greatly improved operation.

This experience is typical of the benefits that can be realized when management recognizes that organized lubrication is a major factor in cost control. Large firms, with plant lubrication engineers, and small firms, where lubrication is delegated to engineers who perform other duties, are uncovering exceptional opportunities to extend part life, eliminate downtime, reduce rejects (even save on lubricant cost) and otherwise add to income.

As consultants, Texaco's organization of Lubrication Engineers, operating in all 48 states, has been effective in outlining a practical approach to these problems. A more detailed discussion is available in an enlightening booklet: "Management Practices That Control Costs Via Organized Lubrication." Write The Texas Company, Dept. F31, 135 East 42nd Street, New York 17, New York.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

For more facts circle 501 on Reader Service Card

FACTORY
MANAGEMENT AND MAINTENANCE

. . . OPINION

Another Look at Cost Reduction

IN THE PAST few months many of us have had an interesting opportunity to take a good, hard look at cost reduction activities under recession pressure. As a result, we can quickly come to one conclusion: Tough times make a big difference.

We'd like to sum up a few comparisons that we think have some significance and that ought to be mulled over by plant operating management. We haven't tried to put these in any particular order of importance because that will vary in each individual case. But we think you will find that at least some of them contain food for thought:

1. In good times, "increased capacity" is a magic word in cost reduction work. Often it is all you need to sell an idea. But in tough times, proposals to boost capacity get a cold reception. When sales volume is down, one of the biggest problems is that you have capacity running out of your ears. Your job then is to cut back on production, not to raise it.

2. In good times, operating management often regards cost reduction and profit improvement as the same thing. In tough times, we quickly discover that's not necessarily so. The tremendous importance of having a break-even volume of business enters the picture, and emphasis shifts to *profit preservation* instead of profit improvement.

One operating management man puts it this way: "When the heat's really on, as it has been with us, our cost reduction activities have shifted from big, broad projects down to small, dirty-handed jobs. We've had to go out and take another look at every single detail of every operation. We are now asking ourselves if we can save a penny here or mechanize a little further and replace a man there. At the moment, we are fighting for pennies and nickels instead of dollars."

3. In good times, it's popular to take the long-term view and look 'way ahead. In tough times, you see much less of this. The pressure for immediate dollar savings increases fantastically. In fact, it goes so far that the *sequence* of cost reduction projects becomes the vital factor. The problem is to give priority to the ideas that give the biggest savings fastest, with the least expenditure of cash.

4. In good times, standard practice is to seek employee cooperation and help, and to spend time in selling cost reduction ideas to employees. In tough times, the tendency is to shrug off such "sissified" approaches and get hard and arbitrary, doing more things by edict. Nobody likes this, but it happens.

5. In good times, the tendency is to push cost reduction activities as far down in the organizational structure as possible, with much emphasis on supervisory and employee participation. In tough times, the tendency is to move the responsibility much further up in management. Often the president or board of directors gets right into the act. When that happens, the most drastic changes take place. This can be brutal, but it's often good to force top management back into closer contact with the organization.

6. In good times, there's a great tendency to emphasize improvements in equipment, machines, and materials as the key elements of the cost reduction program. In tough times, these improvements still go on, but the big emphasis is on reducing *excess personnel*. It starts with direct labor, of course, but quickly spreads over into indirect on a broad base. Carried to an extreme, as it has been in some companies, it leads to widespread slashing of personnel in staff departments—engineering personnel, safety, training, maintenance, plant engineering. It's happening, in some cases, even though it's obvious that serious damage is being done to the efficiency and effectiveness of the organization for the long haul.

Why bother with a recital like this? We editors feel it's important because it explains why—to paraphrase a comment by a friend—it's ten times as hard to sell cost reduction ideas today as it was a year ago.

But, more importantly, we think that listing some of the contrasts may show up the good and the bad things that are happening under the name of cost reduction. We think it may be helpful to remind you that:

. . . *Short-term thinking* is all right, but not if it's too short.

. . . *Slashing away* some of the "little kingdoms" that load up overhead is a good idea, but some other so-called overhead items like maintenance, plant engineering, and safety are vital to the company's survival.

. . . *Concentrating on nickels and dimes* when cash is critically short is smart to do, but it could be catastrophic to forget about the big things that pay off in quarters and dollars.

. . . *Making it too hard* for your people to sell cost reduction ideas may dry up the ideas—and maybe you're not smart enough to think them all up yourself!

FACTORY MANAGEMENT AND MAINTENANCE INTERVIEW

What's troubling you most today? Fast cost cuts—right now? Long-haul planning? Or both? Whichever it is, this exclusive FACTORY interview with H. Ford Dickie will help you find your answers.

How to Make Today's Production

H. FORD DICKIE is top man in production control for General Electric Company. He's the same Mr. Dickie who applied his revolutionary A-B-C controls to inventory management 10 years ago, thus first established his reputation as a shrewd analyst of plant manufacturing problems.

Now, in conversation with a FACTORY editor, Mr. Dickie tells what's new and what's ahead in production and inventory management—updates tried and tested methods—and tells how you can adapt and use today's best techniques in your plant, whether it's big, not so big, or even small.

Where do you feel the biggest quick savings will be found in the areas of production control?

Inventory control is probably the most rewarding area for large cost reductions. In most shops good inventory reductions are quite practical. Often the inventory is 1/3 to 1/2 of the business investment. And it is certainly the part most easily controlled.

An inventory reduction saves money two ways. First it makes more cash available—an important value any time, but especially now. Second, the cost of carrying inventory is generally estimated at 25% per year of the value of materials held. So dollars of profit are improved with any reduction in inventory.

Incidentally, two plants within our company have recently attracted attention with their inventory reduction efforts. The first more than doubled its inventory turnover. The other, concentrating on work-in-process inventory, cut it almost exactly in half. This is convincing first-hand evidence.

Chances are that you also have a good many clerical people in the office and service people in the shop. Their efficiency is another good target area for saving. You can strike at it through systems study and improvement, work simplification, incentives (probably non-financial), mechanization, measurement of performance, and work sampling.

How does production control tie in with cutting costs—cutting them hard and fast?

The steps for successful, quick, sharp cuts in production costs have often been these:

. . . Analyze your operations to find the major area of expense. For example, you might find within the production control responsibility that stock-keeping is the one function that costs the most to operate. Here is the logical place to carry out an aggressive work sampling study and work simplification program. Possible reductions in this area can be readily determined. Effects of sharp reductions on the stockroom's performance can be observed and measured. You can look for similar possibilities in other production service functions such as receiving, shipping, handling through production, and the like.

. . . Initiate a vigorous inventory reduction drive. This can save a lot of money, though not immediately. Why? There is much in the "pipeline" already received from vendors, in process in the shop, etc.

One positive way to reduce inventory is to restrict the input of orders placed for delivery to something less than the amount of material to be used in each future time period. For example, if you plan to use $100,000 of materials in the next six months, permit ordering only $90,000 worth of material for delivery in

"Today's awakening comes in wider use of operations analysis and computers . . . Yet too many of us don't make effective use of proven old techniques"

Controls Cut Costs in Your Plant

that period. This way you will necessarily reduce your excess inventory by $10,000.

. . . Compare measured output of various people performing the same kind of work. This may point up cost-cutting opportunities—especially in clerical and factory service jobs. This is so because changes or decreases in business volume or mix often cause a shift in work loads. Order clerks, for instance, might be measured by the number of bills of material ordered or orders placed. Order typists and stock record clerks can be measured individually or in groups on their volume of work. Production or requisition men can be measured by the number of requisitions handled and their percentage of promises kept.

Using these studies the manager will be better able to recognize opportunities for economies. What's more, these measures for each class of work in the production control function will also serve as non-financial incentives to those who are measured.

. . . Speed up your educational program if you have one. If you haven't one, get started fast. This is an excellent cost reduction method—whether the objective is higher employee productivity, reduced inventories, or reduction in excess cost—from overtime to scrap.

Is now the time to go to mechanized production control?

Not if you're looking for just the quick possibilities in cost reduction. To do a good job in mechanized production control takes a lot of time—time to understand and analyze your business, to develop and plan new concepts, to design your new system, to obtain the equipment and program it, to debug the program, and to educate your people.

Where is poor production control and management most likely to show up?

Most likely in poor scheduling, or suboptimizing. Scheduling is the key to successful manufacturing controls. Admittedly it can often be no better than the marketing forecast received. But assuming these forecasts are good (or you build equipment to special orders), scheduling is the essential ingredient.

The amounts of raw and in-process inventories are largely dependent upon good scheduling. If materials arrive too soon, the result is obvious—too much inventory. If scheduling is sloppy and some materials arrive too late, the result is similar. Why? Because most of the material will arrive on time, but it will be held up awaiting the few late items.

Delinquent materials cause unbalanced work loads in the shop with costly idle time, often followed by costly overtime expense. Delivery to the customer is delayed as a result. All these problems give rise to increased production expediting and its accompanying expenses. The cost of late delivery of equipment to the customer is hard to evaluate. But it's a real cost and can even mean the loss of that customer and of future profitable business.

What are the dangers of suboptimizing?

Suboptimizing occurs particularly during times like these, when there is unusual emphasis on cost reduction. For example, a foreman seeking to eliminate idle time in his shop may generate excess inventories. Conversely, the over-zealous production man seeking primarily to reduce inventory can cause lack of work in

the shop. The marketing man may indeed reduce his investment in finished goods in district warehouses—but simultaneously may cause even more expensive seasonal fluctuations in the factory schedule of manufacturing operations.

How effective is year-round production leveling as a cost and production control tool?

There are many benefits in leveling the shop production rate by fluctuating the stocks of finished goods. The problem is especially timely now (and more specifically solvable than a few years ago). This can be attributed to the advent of guaranteed annual wages and state unemployment insurance, the latter varying in accord with the stability of the labor force in each individual company.

What cost factors must you consider when determining the best production rate for leveling?

There are four general categories of cost you should evaluate here:

. . . *Cost of carrying inventory.* This is often calculated too low, because the value of the money tied up in inventory is not thought of in terms of the opportunity for that money to earn more if it were released for use elsewhere in the business. For comparison ask yourself, "What does the total business earn as a return on its investment?"

. . . *Cost of running out of inventory.* This is difficult and complex to determine, for you should know whether loss of business is temporary or permanent. Buffer or protective stocks to avoid this depletion are calculable if you have enough statistical data on the expected deviation in demand and on the reliability of your supply sources. With protective stocks planned or established, you can then calculate the costs of preventing stock depletions.

. . . *Cost of changing rates of production.*

. . . *Unit cost at various levels of output.* These last two are essential items of information for the intelligent management of manufacturing to a finished-goods inventory. For example, too often we see the finished goods inventory building up rapidly. We know about what it costs to carry this inventory, so we make a suboptimal decision—cut the factory production rate quickly and sharply. The costs of this cut in factory output are not adequately considered because they are neither obvious nor easily calculated. They may include vendor cancellation charges, a higher unemployment insurance rate, bumping costs through multiple levels, idle time, intangible but significant employee and community relations problems, etc.

So the costs of increasing or decreasing the level of output should be determined and related to time—for example, cost of a 10% increase in productive output made in one month, three months, or six months.

With these data on the various costs of changing levels of production, plus the cost of manufacturing a unit at various operating levels and the costs of carrying inventory, you can readily decide how to adjust production economically when it is out of phase with sales. Possibly too many of us have overstressed the minimizing of inventory when we should have spent more effort to determine the optimum inventory.

How should you approach leveling plans?

With caution. Probably many who advocated and practiced leveling in the last generation went bankrupt during the depression. Indeed, there's a dangerous tendency when you follow a leveling plan to continue longer with a high rate of production than you probably would have otherwise. When the actual trend or general level of business has dropped, you must make a downward adjustment. Unreduced levels at such times result in excess inventories, which must be reduced by further cutting the manufacturing rate even below the new reduced sales demand level.

"We were encouraged with apparent improvements in forecasting techniques. . ."

Manufacturing people must depend upon market and sales forecasts. Just how dependable are they?

Certainly sales forecasts are not as accurate as we would like.

We were encouraged with apparent improvements we had made in the techniques of forecasting until the present recession arrived. Now we are disappointed that our techniques did not give us as clear a warning as we would have liked. We are dependent upon the accuracy of marketing forecasts for our buying, upon our direct and indirect labor planning, and upon the establishment of inventory levels. In all these vital functions we must generally anticipate our needs based upon marketing predictions.

In many businesses a new commonness of interest may appear where marketing and manufacturing cooperate in leveling production and stabilizing employment through fluctuating finished goods inventories. The success of such a program rests on good forecasting.

Occasionally you still find the marketing man who justifies his lack of a forecast by reasoning that the line of products is so hard to forecast accurately that any prediction he made would simply be misleading. He apparently does not recognize that somebody must do the forecasting. In this case it probably will be done by the production department—and will be based solely on past usage. Certainly, as a minimum the marketing people can do that well.

What is being done to improve sales forecasting for production needs?

Despite imperfections, the techniques of sales forecasting are receiving competent attention. Good mathematical and statistical analysis and an accumulation of experience will improve the results.

One advancement has been to report district warehouse sales to the manufacturing plants daily, using punched tape. The tape furnishes information in machine-sensible form. The information is quickly summarized and analyzed to adjust manufacturing plans promptly. This permits some plants to schedule production with sales instead of forecasts. The value of such data processing cannot be minimized.

In production, a rapid mechanized assimilation of forecast data substantially shortens the total time required to deliver the equipment. This in turn will permit you to use shorter-range predictions, which are inherently more accurate than long-range ones.

Another recent forecasting method has proved especially useful. This technique is based on forecasting common components and materials rather than finished units of equipment. The total number of common components is much less than the total number of finished units. For example, instead of attempting to forecast the sales of each type of a wide variety of motors, you might try forecasting more accurately the amounts of copper wire, shaft steel, core iron, and other materials that can be fabricated and assembled into different types of motors.

You can see that this system permits beneficial averaging of the estimated requirements for various devices. Not only is it more accurate. It is also more directly useful to the production man.

In effect, this system does an initial part of the work normally done by the production man—exploding material and parts requirements and then consolidating like parts for material ordering.

Still another innovation for the production office is the G-E computer, the Productron. It was developed especially to permit the master production scheduler to understand clearly and quickly what a sales forecast can mean to his shop in the way of loads on the various manufacturing areas or on critical work stations. With this analog computer we can rapidly calculate the effect of producing a variety of finished devices in a number of work areas. The basic computer unit will handle 50 products on 24 work stations—and can be expanded if desired.

What have been the important changes in production management techniques during the past ten years?

Embarrassingly little has changed in our fundamental production and inventory control techniques during the past 5, 10, or even 20 years. Just over 20 years ago the late Thomas M. Landy introduced a simple but sound and comprehensive production control system. Its fundamental is the economical preparation and duplication of all manufacturing control and related paperwork from a single Hectograph master. (And there are still many who could profit from this basic concept.)

For some years after Landy's contributions there was no noteworthy general improvement. The most significant development was probably the punched-card systems. This has brought many economies and has made the more voluminous computations of material requirements and work loads more accurate and faster. But there has been little change in the technique itself.

Today's awakening in production control seems to have come only in the past couple of years with the maturing and wider use of operations analysis techniques and the broader understanding and more general availability of electronic computers.

Why the delay in finding successful applications for computers to production control problems?

Well, for one thing, all of us had to become acquainted with the capabilities of the new computers. First applications were largely the mechanization of familiar routines. This was as natural as the first automobile being simply a "horseless carriage." Now whole new concepts of controlling manufacturing are beginning to evolve with the real appreciation of what computers can do for us. It's slow, hard work for most of our controls. And decisions up to now have been based on accepted practices that are not necessarily arithmetically logical and therefore may be unsuited to mathematical computer solutions. So first a pattern of logic must be found in the product and the business, and then it must be quantified.

In what field of research and development do you think the breakthrough in production control technique will take place?

Operations analysis techniques, and even communications theory, have focused new light on production-scheduling and inventory-control problems. These problems are so complex and dynamic that they are favorite operations research projects. The solutions seem to lie in mathematical models or simulations.

Inventory control models and production control simulations have been constructed to include many of the variables that should be considered. These models at last permit us to give logical, mathematical weight to the many factors we had not been able to intuitively balance without them.

So now we find we must first really understand the business and all the relationships—in the design of the product as well as in the manufacturing process. Next this information must be put in mathematical form for logical analysis and manipulation. Finally I believe we must be sure that our organization is retrained and radi-

cally reorganized. It will probably turn out that our old concepts of functional responsibilities will have to be substantially rearranged—certainly they must not be allowed to drift into some new pattern without a logical plan.

Have model making and simulation techniques been applied to production control at G-E?

Yes, in two job-shop plants and one semi-flow type plant. We are now completing mathematical models of key portions of their manufacturing operation. With these models we can develop better scheduling and flow plans for these shops. Our three-fold objective here is meeting schedules, keeping men and machines well utilized, and doing both with minimum inventory.

Will you briefly define these models?

They are representations of typical manufacturing job shops. But they are explanatory rather than descriptive. By this I mean that we use them to predict how various plans of operating this shop might affect our three key result areas—meeting schedules, utilizing men and machines, and keeping inventory at minimum. Consequently we can make these manipulations without disturbing the shop. In effect, we operate in parallel with it. Here's the opportunity to solve problems where men and machines in complex relationships, experiencing irregularities, are too complicated for mathematical solution.

Can you give an example of what the model tells you?

For one thing, we increase or decrease the number of jobs that are waiting ahead of the machines (the queue). Then we run a series of simulations to observe the queue that seems optimum by obtaining minimum cost. For example, we try to balance the improved utilization of men and machines against the increased cost of carrying the higher inventory.

Are these mathematical models large enough to require computer solutions?

Yes. On two models we are using large-scale computers. This way, we get rapid and economical runs in our "cut-and-try" development of quantitative scheduling and manufacturing control plans. In fact, the availability of the large computer made it feasible to do this much needed research.

What can a plant do if it doesn't have a computer?

I think you'll need access to some kind of computer—although not necessarily a large one. There are several reasonable solutions.

First, consider an original research or development simulation. If a large computer is required, as it may well be, you can rent time at any number of computer installations. The manufacturers offer service-center facilities. Others who have computers (industries, universities, etc.) often will rent time on their machines, especially second- or third-shift time. Once this development has been checked, simulation to be used in shop control may feasibly be reduced so it is suitable for running on a medium-sized computer.

You may be interested in one scheduling experience we had at G-E. We set up the simulation on a medium-sized IBM 650 computer, since that was the machine available in the plant. But, before the computer program was debugged and running, the men who had gathered the data, stated the problem, and established the quantitative relationships of the critical elements of the problem foresaw clearly their current operating shortcomings and anticipated what the computer runs were going to reveal. They immediately made substantial, significant, and beneficial changes in their job scheduling. To be specific, they cut in-process inventory over one-third simply through clear understanding of the problem. How much more will be accomplished when the runs are made is yet to be seen. But certainly it cannot approach the improvement already accomplished—without the use of a computer at all!

You imply that operations analysis with or without the aid of a computer will have significant results?

Certainly. This type of approach should lead to a fundamental change away from the inconsistent rule-of-thumb intuitive production planning and scheduling based largely on experience. It should make available logically derived, consistent, quantitative-formula schemes of control. We believe this may be as important an advancement as has been made in production control in many years.

How do you plan effective introduction of such radically different techniques to plant operating people?

This will require a planned educational effort—and selling. We're planning to use the "gaming" technique (FACTORY, March, 1958, p. 146). Production supervisors and schedulers attending a class will be divided into small groups to compete in a realistic scheduling game with shop work orders released to them "daily." They will try to meet schedules most economically while the game imposes on them "real" unanticipatable disturbances of scrap loss, employee absenteeism, and machine downtime. Their results can be scored. This will show each small team how well its method of scheduling and dispatching handles this typical problem. Next, the same problem will be solved mathematically, using the scientifically determined formulation, and the results again measured. We are sure the sharp contrast in results will sell our people on the new way.

If your scheduling-dispatching factors can be weighted with mathematical precision, will you be able to schedule production electronically?

We hope that we can eventually do preliminary and routine scheduling mechanically or electronically. If our simulations are comprehensive enough and our trial

"We should be able to do a far better job—less expensively."

runs ingenious, we should be able to do a far better job—and do it less expensively. What's more, we should be able to reschedule a whole shop logically and expeditiously.

Do you foresee automatic scheduling as the main advance in production control systems?

No. First, there's still much more to be done in scheduling than simply making present scheduling techniques automatic. Second, a similar model-simulation approach is beginning to be applied to the important inventory control problems with the promise of valuable results. Third, I believe data processing computers and factory automation will gradually permit us to develop entirely new concepts of production control paperwork. Not by mechanizing what we are now doing, but through radically new approaches to the problem of converting the incoming customer's order most directly and economically into machine instructions for producing the parts and devices desired. For example, if a machine tool is electronically instructed, is there any need for blueprints?

Mr. Dickie, you are the man who first applied the A-B-C principle to inventory control. In your work at G-E do you apply this concept to all classes of inventory—materials in process as well as stock?

Yes, we do. As you know, there are two basic elements to consider in inventory control—time and money. We make sure that these two controls are applied to all three broad inventory classifications—raw, in-process, and finished stock.

Raw material inventory is material that has been received in the plant but upon which no direct labor has been performed. This is typically the material in the incoming-material stockroom.

Work-in-process inventory consists of items on which some, but not all, of the direct labor has been performed. Usually these are the parts and equipment on the manufacturing floor in an incomplete state.

Finally, finished goods inventory is those goods on which work and testing has been completed. They may be finished parts, like renewal or spare parts, or finished goods.

Can you help us visualize this concept of total inventory control?

Glad to. Let me show you what we are going to use as a graphic representation of our concept of inventory in a new G-E inventory control course.

The three-phase inventory cycle (graphically shown in the photo below) starts (on the left panel) with incoming raw materials. It shows the cost of maintaining inventory through the entire manufacturing cycle in terms of dollars (vertical axis) and time (horizontal axis). The raw material is divided into two elements. The protective stock base (bottom of left panel) is carried to avoid running out of stock when demand exceeds planned usage or when suppliers fail to deliver as expected. The sawtooth designates economic order quantity receipts and subsequent usage.

Economic order quantities can be determined by formula either through balancing the costs of set-ups and piece prices with the cost of carrying inventory or, for purchased parts, balancing the cost of acquisition against carrying costs. Finally, for purchased items, any quantity price discounts must be evaluated.

The three-layer build-up of work-in-process (middle panel) is the accumulation of A, B, and C item costs as they go through the manufacturing cycle. (A, B, and C is our designation for expensive, average, and inexpensive items.) As these items move through the shop, direct labor and overhead are added to the mate-

"The three-phase inventory cycle starts with incoming raw materials."

rial costs to develop the total value shown. The many "C" items are scheduled for early arrival with an entirely safe lead time. The few expensive "A" items arrive close to the required time and move quickly through the shop to minimize inventory investment.

Production leveling (middle panel of photo, p. 73) can be accomplished by fluctuating the finished stock and thereby permitting some absorption of the fluctuations in demand, especially where they are predictable, as in seasonal buying.

The finished stock (right panel, same photo) is shown as having an increasing value because of the cumulative cost of carrying that inventory. So we briefly define inventory management as being responsible for inventory from the time it comes in the front door until it is billed to the customer.

Will the new development in scheduling solve most dispatching problems at the shop level?

Having work well scheduled as it comes to the dispatcher is probably the biggest improvement a dispatcher or foreman could wish. But such perfection is still a long way off.

Practically, there are many upsets that even the best scheduling plan can't anticipate. So the dispatcher must keep rearranging priorities to match the actualities that develop—rejections, absenteeism, machine breakdown, and changes in urgency that inevitably occur when parts of the same assembly fall behind schedule.

What new dispatching techniques show most promise?

The "new" techniques of dispatching are not really new. They have been evaluated and organized and their value has been recognized. For example, we now know the potentialities of such dispatching techniques as: (1) Lap phasing—for saving processing time; (2) alternate sequencing of operations to permit greater dispatching flexibility; (3) alternate machine processing possibilities with the related costs clearly slated; (4) understanding the relationships of the set-ups for all jobs on one class of machine.

. . . *Lap phasing.* It's useful in the job shop where you make parts in economical quantities or special lots. This scheme plans for the early pieces completed on the first operation to be started on the second and subsequently on the third and fourth operations, while the later parts are still being processed at the first operation. With this parallel-versus-series-sequence in processing we can have many of the advantages of a flow operation in the job shop. Obviously there is an inherent transportation problem.

. . . *Alternate sequencing.* This depends upon first recognizing where parts can be made in more than one sequence of manufacturing operations. Often such knowledge will permit the dispatcher a worthwhile choice between two or more operations as the next step in processing a part. With such choices he can expeditiously and efficiently schedule his various work stations.

. . . *Alternate machine processing.* This requires little more than a statement of the various machines upon which an operation on a particular part may be performed, with the accompanying costs. With this information the dispatcher can make an intelligent selection when the use of a substitute machine seems judicious to be indicated or justified.

. . . *Relating set-ups.* This is nicely accomplished by establishing a code relating types of set-ups so the dispatcher may give consideration to dispatching in sequencing work that will require the least time for a set-up.

"The new dispatching methods are broadly useful regardless of plant size."

There are some other promising techniques of establishing dispatching priorities that we are working on in conjunction with our scheduling models. We now expect that the feasibility of these new approaches will be proved out during this year.

Here's the kind of problem we hope to solve: The typical dispatcher receives too little significant information on the status of the part he is producing. Therefore his priorities may be erroneous, and it's conceivable he may be spending overtime money or taking other expensive means of expediting a part when the mating parts have already been delayed. We haven't found a good solution for this problem in large businesses, but we are improving communications generally, which is certain to help.

For example, the dispatcher's reporting of progress in his area has too often been done on a 100% basis. Such a huge volume of reports coming to the central production-progress report center turned out to have little individual significance. Though hard to effect, a system of reporting progress only by exception seems to be far better. This is a no-news-is-good-news basis. Any report of failure to meet a schedule must be made at the first instant delay is foreseen. This provides maximum time for corrective action.

Can small plants use or adapt these new techniques to improve their planning of control and inventory?

Almost every plant has enough shop employees to justify a dispatcher, whether it be a full-time job or part of the foreman's job. So the new techniques in dispatching are broadly applicable regardless of size.

I agree that the really small business may not have the mathematical model maker available to work specifically on its problems. But the results of successful research work by specialists in industry, universities, and government agencies are broadly publicized. New technologies are covered in technical journals, government publications, and business magazines similar to FACTORY. In addition, new developments are presented and discussed at professional society, trade association, and professional management organization meetings and are being taught at many universities. So I see no reason why a small plant cannot adapt these principles to its own operations. All it requires is initiative and ingenuity.

For example, the work we are now doing in production scheduling is based on research at the University of California at Los Angeles for a number of years under a naval research contract. The results of this work are periodically published and available to anyone. There are also an increasing number of excellent consultants who specialize in this field and are well acquainted with all the new techniques. Anyone can retain these specialists for a fee.

Do these new techniques make the old-fashioned production and inventory control methods obsolete?

Far from it. Too many of us become over-intrigued with new ideas and don't make effective use of the proven old techniques. In addition to the tried and true production control systems, there are also other good management tools that should not be forgotten—ranging from systems analysis to work samplings to good measurements.

Any company would like to know how well it is managing its production and inventory control functions. What sort of measurements can you suggest?

There are many good measurements. Specifically, here are some of the key ones we look at:

. . . *Turnover* is the long-standing, over-all measure of inventory management—that is, annual output divided by average inventory. Turnover is a good measure and a significant one, but it must not be the sole objective of inventory control. Better to plan optimum inventory amounts for each month and use these "budgets" to gage inventory performance. You may also include in your balanced plans not only turnover of inventory but also items which encourage larger inventories, like the shop capacity to be gained through leveling production and the savings in purchasing costs through larger order quantities.

. . . *Levels* of protective stock at the time new orders arrive is a good measure of raw-material inventory control efficiency. Wise use of economical order quantities is another.

. . . *Processing time* related to the total production cycle time will give a measure of the efficiency of material movement through the shop.

. . . *Annual physical inventory* data will provide a periodic evaluation of your inventory control. Accuracy of stock records, amount of material lost, quantities of obsolete and surplus material will be clearly shown. These figures can be compared to budgets—or at least to the comparable amounts of prior inventories.

. . . *Specific audits* of inventories on the factory floor, in the stockroom, and of the stock records will provide a simple, direct measurement for the inventory control supervisor. While he may not get quantitative evaluations of the areas that are generally satisfactory, he will be able to spot the badly operated functions.

. . . *Per cent of delivery promises kept* will give a good measure of how well production is being controlled. A standard for per cent of promises kept must be firmly established—and each production manager's performance checked against it frequently. Your marketing department may also be able to measure your service to the customer and your production control effectiveness by furnishing data on the per cent of business lost because of excessively long promises.

How can you measure how well production services manage their own affairs?

In the office, whether you are evaluating order or requisition men, stock men, or paper-preparation girls, you can establish standards of output and make measurements—if only against past performance—to gain clear indications of trends and outstanding individual performance, whether it be good or bad. If you add backlogs of work to the data, you have a further measure of the status of the paperwork flow in your office.

The materials manager's responsibility in the stockrooms, receiving areas, and shipping rooms can be periodically evaluated through good work-sampling studies. These studies not only show whether your people are using their time effectively. They also indicate the manner in which they spend their time. And they provide you with material for reviewing the layout and systems efficiency.

Your dispatchers must be measured on at least two of their responsibilities:

. . . *Per cent* of schedules they maintain.

. . . *Man and machine utilization* in their areas, the ingenuity with which they keep operators and equipment well occupied.

Lastly, as in any operation, the production manager should evaluate his own organization for competence, balance of capabilities, growth potential, and depth of talent. A systematic review of management development charts or some definite periodic review of managerial appraisal and performance should be established.

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3 Lighting Problems ...and Answers

Your next move: high-intensity lighting to meet today's exacting tolerances and quality standards. Here are three low-cost ways that will boost your plant illumination.

THESE TWO PAGES tell a three-company story on lighting. The story will give you plant-tested answers to a problem many companies have to face up to—right now. The problem: Boost illumination up to today's "must" levels of high intensity. Do it with minimum change in plant structures, minimum interference with operations. Make it look good. And do it at lowest cost.

The three heroes of this story are all in California. They are Cannon Electric Company (Los Angeles), Lenkurt Electric Company (San Carlos), and Douglas Aircraft Company (Santa Monica). To see how each made its own attack on its own problem, read on.

1. Light Up a Basement Area

Problem—Cannon's plant engineer, Lawrence V. Herich, had to provide at least 75 foot-candles of light to a basement area needed for a new data-processing department. Acoustic treatment was necessary because of the 11-ft. dish-type concrete ceiling with 1-ft. deep cells (top photo). What's more, Cannon didn't want the lighting system to interfere with the sprinkler system. And the glare had to be minimum because employees would be looking at small figures almost all day.

Solution—A system that uses open-top channel-type fixtures with lamps in continuous rows (lower photo). Plastic diffuser provides 85% light upward, 15% downward. Recessed areas in ceiling have been covered with off-white random-hole acoustic tile. Tile is brought down to the 4-ft. level on the walls.

Results—A practically shadowless system with a maintained level of 105 foot-candles. Plus excellent acoustical treatment.

Maintenance is easy. There are only two places where dust might affect light output—the top of the lamp and the inside of the plastic diffuser. For both, on-the-spot cleaning is quick and easy with a damp cloth or a vacuum cleaner.

2. Light Up a Big Assembly Area

Problem—Lenkurt wanted to relight an 86,000-sq. ft. assembly area, where hundreds of people work (top photo). But Lenkurt wanted more than maximum light at minimum cost. The new system had to be aesthetically attractive as well.

Solution—Don Grider, Lenkurt's plant engineer, decided to shoot for a wall-to-wall daylight ceiling effect. This way, he could re-use the fixtures he had, conceal the unattractive under-roof structure, and at the same time cut down the noise level considerably.

Lenkurt's new system was installed over several months—with minimum interruption of production. It uses extruded aluminum channel grooved to support corrugated vinyl plastic. The plastic (comes in rolls) is simply slipped into the channel and cut to length.

The plastic melts and falls out of place at 140 F. That's 25 degrees below sprinkler operating temperature, so there's no possible interference with sprinkler protection.

Results—Lighting level of 80 to 90 foot-candles (lower photo). Employees and supervisors are enthusiastic—no more complaints of eyestrain, no more need for tinted glasses. Lenkurt now plans nearly 300,000 square feet of such lighting.

Though lamps are concealed, maintenance is easy and low-cost—about 2.8¢ per square foot for removal, cleaning, installing. Plastic ceiling is rolled up, washed in a tub. Open lamps and reflectors are cleaned same way as other systems.

3. Relight for Precision Work

Problem—Douglas's engineering computing room and the precision test and inspection area were illuminated with typical 40-watt, two-lamp fixtures. Both places had to be relighted to meet acceptable modern levels for precision work.

Solution—J. E. Geasland, Douglas's electrical engineer, came up with one answer for both places (photos). He worked out a system that uses lightweight aluminum "T" channel supported by quickly installed suspension wires hanging from roof trusses. Wire raceways, connection boxes, and ballasts are mounted wherever needed along the top edge of the channel. Glass fiber panels, cut to fit around sprinkler fittings and ventilation ducts, fit down into the grid framework.

Results—Lighting in engineering computing room, 150 foot-candles (with diffuser); in precision test and inspection area, 100 foot-candles (without diffuser, but with open lamps on 6-ft. centers).

New system makes an attractive acoustic ceiling. Ballasts above insulating ceiling eliminate several kilowatts of ballast heat loss from air conditioning. Access to utilities in plenum: just push up most convenient ceiling panel.

◆ BEFORE . . and ◆ AFTER

PROBLEM:	Cut glare to minimum. Use ceiling for reflector, treat acoustically.
Area or type of operations	Data processing department, 2520 square feet.
SOLUTION:	
Type of installation	Suspended single-lamp channel; continuous plastic-bottom (Perfect Vision) fixtures.
Lamps	800-ma., 8-ft.
Mounting	6-ft. centers, 8-ft. height; ballast on cross channels.
RESULTS:	
Foot-candles	105
Installed cost (per square foot)	$1.00
Power use (watts per square foot)	4.15

◆ BEFORE . . . and ◆ AFTER

PROBLEM:	Provide better light for close, complete assembly work, better appearance in working areas. Salvage present fixtures where possible.
Area or type of operations	Small electronic parts assembly, 86,000 square feet.
SOLUTION:	
Type of installation	Plastic wall-to-wall false ceiling, slipped into channels and cut to length, hung below continuous rows of open fixtures, giving wall-to-wall daylight effect (Sylvan-Aire).
Lamps	430-ma., 8-ft.
Mounting	4-ft. centers, 3 feet above false ceiling, 16 feet above floor. Ballasts in fixtures.
RESULTS:	
Foot-candles	80 to 90
Installed cost (per square foot)	$2.25
Power use (watts per square foot)	4

◆ ANSWERS ◆ for two problems

PROBLEM:	Better light, acoustical treatment.
Area or types of operations	Area A (top): engineering computing room, 2500 sq. ft.; B (lower): precision test and inspection area, 9400 sq. ft.
SOLUTION:	
Type of installation	Exposed aluminum channel supporting glass-fiber acoustic ceiling; rows of two-lamp fixtures (Drive-Lok).
Lamps	Both areas: 430-ma., 8-ft.
Mounting	Ballasts above ceiling. Area A: 4-ft. centers, 9 feet above floor, with diffusers; B: 6-ft. centers, 10½ feet above floor, no diffusers.
RESULTS:	
Foot-candles	Area A: 150. Area B: 100.
Installed cost (per square foot)	Area A: $2.21. Area B: $1.84 (including ceiling, removal of old system).
Power use (watts per square foot)	Area A: 6.1. Area B: 4.1.

7 Laws for Making Plant Rules That Will Stick

1. Make the rule reasonable

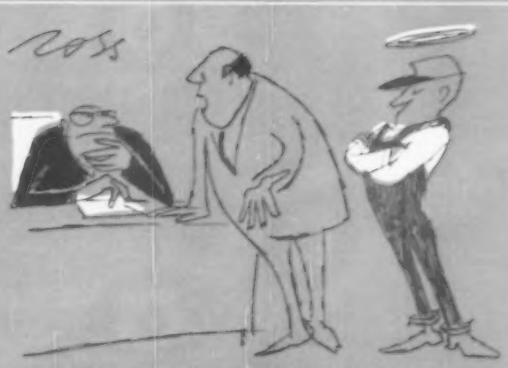
2. Stay out of private lives

3. Don't keep rules in your hat

4. Correct—don't punish

5. Make the punishment uniform

6. Don't double up punishment



7. Grant the benefit of the doubt

Tips to Successful Discipline

Now—from a 20-year-old maze of arbitration decisions—a labor-law expert sifts out 7 guides for effective plant rules—and 11 keys to proper punishment.

FEW THINGS puzzle plant management more than the problems of plant discipline. When do you clamp down on an errant employee? When do you look the other way? How tough can you get with him without disrupting employee morale—and plant production?

Discipline becomes even more complicated when you operate with a union and the threat of an adverse arbitration award hangs high over every penalty you hand out. The ever-present question: How far can you go in penalizing a worker without having to eat crow later on before the arbitrator?

Out of thousands of arbitrators' awards (published by such services as Bureau of National Affairs, Washington; Prentice-Hall, Inc., Englewood Cliffs, N. J.; and Commerce Clearing House, Inc., Chicago—from which illustrations in this article were selected at random) handed down over the past 20 years, there has developed a sort of common law of employee discipline. It tells you what punishment should go with what crime—and how and when you should hand it out. Rules of thumb, admittedly, but clearer guides than ever before available to employers.

Arbitrators, who handle 10 discipline cases for every one that comes before a plant executive, have developed a "feel" for employee relations. Whether or not you agree with their conclusions, they have laid down the rules for administering plant discipline. You must play by these rules if you operate under an arbitration clause. Even without an arbitration clause, you'll find them useful benchmarks in disciplining employees.

Plant Rules That Make Good Sense

Before looking into employee crimes and misdemeanors in 11 important areas, and the punishments applicable to these offenses, let's first examine the seven common laws against which all arbitrators seem to check all discipline cases.

1. MAKE THE RULE REASONABLE

That's the key to having your rules stand up in arbitration. Sure, a company can make rules governing employee conduct in the plant. Fact is, the employer is probably given more leeway in this area than he is in any other. But once in a while he's liable to run clear out of the ball park.

Take the Detroit Gasket Manufacturing Company award. This company set up a rule: Employees may have 48 minutes a day for personal use—10 minutes for coffee, two 5-minute wash-up periods, and 28 minutes for personal relief.

"That's not a reasonable rule," concluded the arbitrator. Could an employee loiter away his whole 28 minutes? If he loitered away 25 minutes, did he then have to take care of his personal requirements in the remaining 3 minutes? Said the arbitrator: "It's not reasonable for a company to set up a system that permits employees and supervisors to spend time rehearsing the details of an employee's washroom habits."

By PAUL A. KING, Attorney
Bigelow-Sanford Carpet Company, Inc., New York
(Author of Factory's monthly "Labor Relations News")

2. STAY OUT OF PRIVATE LIVES

An employee's private life is *his* private life. Reasonable rule-making for the job is okay. But the employee's life away from the plant is his own. Don't try to regulate it except in one instance: If what an employee says or does outside the company injures the company's business or reputation, the company can tell him off and get away with it in an arbitration.

Two examples:

Some time ago the Iowa State Employment Service ran a public meeting to get the help of Des Moines women's club in meeting the stenographic and clerical help shortage. At the meeting an employee of the Northwestern Bell Telephone Company made disparaging remarks about his company's wage and personnel policies. He was fired. The discharge was upheld.

Ordinarily, squabbles between an employee, his wife, and his mother-in-law are of no concern to the boss. But when the employee knifes the two of them, that's different. The employer—in this case, a packinghouse—fired the knife-wielding employee because having him on the payroll would adversely affect his workmen's compensation coverage. The insurance company previously had threatened to cancel the coverage if the company retained any wild-eyed employees on the payroll. An arbitrator upheld this discharge.

These two employer excursions into the private affairs of employees were condoned because the company's interest was injured. But so zealously do arbitrators guard an employee's right of privacy that you

Begins on page 78

"...announce the penalty for a rule violation"

can't always count on your company's interest to give you the right to meddle or pry.

At one point, arbitrators draw a sharp line. Take this case: Plant guards broke into an employee's locker. Found a knife there. This evidence was not admissible, the arbitrator said. The locker is a private domain. In another case, an employer who peeked into his employee's purse to get evidence was given short shrift. All this took place on company property.

3. DON'T KEEP RULES IN YOUR HAT

The law of the land may be obsolete, musty, and centuries old, but ignorance is no excuse for disobeying it. But in plant life ignorance is a good excuse if the employer fails to publicize his laws. It's axiomatic: Before you penalize an employee he must know the rule he is accused of violating. The burden is on the company to announce the rule to all employees in clear tones. How? Through handbooks, letters, memos, union contracts, and bulletin-board notices. Word of mouth will do if you think that later on you can prove exactly what you said.

Arbitrators feel strongly about this publication-of-rules business. So strongly that sometimes a miscarriage of justice will result. The Atwater Manufacturing Company (Plantsville, Conn.) presents such a case. This company fired two workers who did not punch their own time cards. The arbitration board that heard this case said: "The board has no evidence of . . . rules (being) posted . . . The board has no evidence of any warning of the company" that employees weren't allowed to punch each other's cards. "Reinstate the two workers," the board ordered.

A rough result—but it emphasizes the importance of the publicity rule. Rough because it seems to fall within the exception most arbitrators create for offenses that are obviously wrong, such as stealing or getting drunk on the job. No posting is required for such obvious infractions. You can take it for granted that the employee knows it's wrong. A practical example: An enterprising employee of the Glenn L. Martin Company lent money to his fellow employees at interest ranging from 520% to 1040% per year. The company fired him. The union rallied to his defense, citing his 17-year good record. It accused the company of firing him without warning. The company answered that no person, unless his character is defective, needs a rule to know such a thing is wrong. The arbitrator saw it the company's way, upheld the discharge.

A company may change its rules in midstream (as long as it violates no contract) or dust off a previously unenforced rule. But if it expects employee obedience, it must notify employees of the change. Condoning violation for a long time will lose the rule for your company unless you repost it and show you intend to enforce it beginning at such and such a time.

When publicizing rules, it's a sound idea also to announce the penalty for violation—such as a warning slip or a suspension. And if it's discharge, better state in so many words that that's the penalty. Except for heinous and glaring offenses, arbitrators tend not to uphold a discharge unless the culprit was well aware of the penalty.

The Wiley Machine Company fired a worker who was reading while waiting for completion of a production cycle on an automatic machine. Six weeks before, he had been reprimanded for the same offense. But because he wasn't told then that if he did it again he would be discharged, the employer was ordered to reinstate him. The moral may be that when you reprimand an employee, tell him three things: (1) What he did that was wrong. (2) Why it was wrong—what rule it violated. (3) What will happen if he does it again.

Then, quickly, while it's still fresh on your mind, write a memo on how you handled the situation and what you told the employee. File this with his record. If it's feasible, file the other copy with the union. This will improve your chances of making discharges stick when you go before an arbitrator.

4. CORRECT—DON'T PUNISH

The capital punishment of industrial life, discharge, is not to be handed out lightly. The employer's objective is to get the job done well at the least possible cost. Termination means rehiring and retraining, not to mention lowered morale. All this spells higher costs. If a heavy-handed employer—and his supervisors—don't see it this way, arbitrators do, and then it becomes a matter of how much crow you care to eat. Arbitrators look at the other side of the coin, too. For the employee discharge means the loss of vacation, insurance, and pension rights as well as take-home pay. So arbitrators look hard and long before they sustain a discharge. The employee ought to be warned in advance that the offense carries a discharge penalty.

Let's now add these principles:

. . . *Reserve* discharge for the more serious offenses such as stealing, arson, gambling.

. . . *Order* discharge in minor cases only when less stringent penalties (reprimand and layoff) have not been effective. Arbitrators say: "A discipline system should provide progressively harsher penalties for same or similar offenses."

. . . *Take* into consideration, in assigning a penalty, the employee's record and his service with the company. And don't overlook mitigating circumstances: Did he start the fight? Was he the ringleader, or did he follow suit just to be one of the boys? Did he refuse overtime work because he had more than his share in the past few weeks?

. . . *Consider* the gravity of the offense. The punishment must fit the crime—provided that it also fits the union contract. Take the strange case of the Virginia plant of Sylvania Electric Products Company, where kindness was superseded by the union contract:

The contract with the union gave management the right to fire workers who engaged in an unauthorized walkout. When 96 workers went out on a wildcat strike,

the plant manager fired them. Then, after thinking it over, he reduced the penalty to a two-week layoff. Giving the contract a strictly legal look, the arbitrator overruled the plant manager who had second thoughts. The only penalty the contract called for, the arbitrator said, was discharge. The plant manager had no right to change the penalty to layoff even though it was less severe. The award: full pay for the two weeks the workers had been suspended.

In another case, where the company laid it on heavier than called for by the contract, a kind-hearted arbitrator wasn't able to change the result. The contract of the Afro-American Company (Baltimore) expressly stated that the penalty for failing to report for scheduled holiday work was loss of holiday pay. The arbitrator found that the workers who did not report on a certain July 4 were morally reprehensible—particularly when considered in the light of their previous attitude. But the employer's penalty of suspension for four days was improper. "Stick to the contract," the arbitrator reluctantly ordered.

. . . *Make* the penalty certain and definite as to severity and duration. Bethlehem Steel Company's Pottstown works lost its case when it laid off an employee until he showed willingness to conform to the rule he broke. The arbitrator rejected this penalty as indefinite—also an unnecessary challenge to the employee's pride. And in an award involving the Downington Iron Works the arbitrator ruled that though an employee who carelessly damaged a machine should have been disciplined, the penalty of suspension until machinery was repaired was not in the cards. Such a penalty was indefinite—predicated on chance and not the nature of the offense. Also vetoed, in another case, was a layoff until the employee was willing to finger the fellow who punched his time card for him.

Not all of the above is necessarily gospel. It represents the view of many an arbitrator—perhaps the very one you may come up against. But there are arbitrators who look at things in a different way. For example, some will not mitigate a penalty ordered by an employer—if the employee is found guilty of the crime. It's not their province to do so unless contract language authorizes them, they reason.

5. MAKE THE PUNISHMENT UNIFORM

You may own every share of stock of the company. But it cuts no ice with the arbitrator if he thinks you're playing favorites among your employees. This feeling is practically universal. For the same or similar offense, the arbitrator expects you to pass out the same or similar punishment.

There are exceptions, however, to the question of uniformity in punishment, as follows:

A more severe penalty can be imposed on the leaders of a wildcat strike or slowdown than on the followers. Stiffer punishment can be assigned to the instigator of a plant fight than to a man who merely defends his honor. And union stewards are sitting ducks for tougher penalties, since they have a higher degree of responsibility. They're supposed to be (just in case you haven't noticed lately) supporters of the contract, imbued with the calm, judicious, non-belligerent approach to contract enforcement.

6. DON'T DOUBLE UP ON PUNISHMENT

The principle of no double jeopardy—sound enough in the law courts—has been carried over to arbitration hearings. When you punish a worker for an illegal act, he has every right to believe that he has had it.

An International Harvester worker turned out defective work. His foreman asked him to go home and report to the labor relations department next day. The worker became abusive. Then the superintendent got into the act, decreed that the employee be reprimanded and given his job back. But Solomon's wisdom was not enough here. The foreman became unhappy. Next day he griped about how unfair the decision was—to him. The superintendent panicked, threw in the sponge. He fired the worker. "No good," ruled the arbitrator. "You punished the man twice for the same crime."

It's okay, though, if you make it pretty clear to the employee and the union that the layoff was an interim penalty.

7. GRANT THE BENEFIT OF THE DOUBT

To state this in a dignified way: In most instances, particularly in a discharge case, the employer must show by clear and convincing proof that his employee was guilty of the alleged offense. Degree of proof required may vary with seriousness of the charge, contract language, surrounding circumstances—and the good nature of the arbitrator who hears the case. Once in a long while an arbitrator will rule that the union must show that the employer was wrong. But, generally speaking, the burden is sustained. Once it is sustained, it becomes the job of the union to prove that the penalty imposed by the company was unreasonable.

What kind of proof must the employer introduce?

Arbitration is supposed to be informal. But this doesn't mean all rules are thrown out and arbitrary arbitration is the order of the day. In many jurisdictions, loosely-put-together awards can be taken to court and upset there. Also, most arbitrators find their work rewarding dollar-wise, and they seek more arbitration work. A sloppy arbitrator will not be handed many more cases. Thus sound rules of evidence (spun around the principle of giving the employee the benefit of the doubt) have been developed by arbitrators. Here are a few:

. . . *Confessions* of guilt are admissible—but not if obtained through inducements, commitments, or threats.

. . . *Discharges* will not be upheld generally if they are based on uncorroborated and anonymous accusation of a fellow employee. They may not be upheld even where the accuser is named. In the Riverton Lime and Stone Company award the arbitrator wondered if it was a good principle of industrial relations for one employee "to report another for an infraction of some general rule where no property damage occurs or no loss to customers is involved, and cause that employee to be fired." He answered himself with "No," saying it was bad practice to discharge one employee on the uncorroborated evidence of another.

. . . *Hearsay* evidence is admissible—but only for what it is worth.

. . . *Circumstantial* evidence may be enough to convict an employee—was enough, in fact, to convict an em-

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ployee of violating a no-smoking rule when the circumstances were such that only he could have created the smoke in the washroom.

. . . *An employee's* bad past record, showing a course of conduct that indicates the likelihood of his having committed the offense in question, may be introduced. But past acts must be proved.

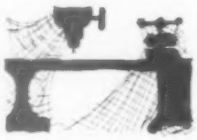
But there is one break arbitrators unanimously give to employers: An employee who disagrees with a rule must obey first and argue later. For instance, Avco Company posted a notice that coffee breaks would be cut out. Plenty of advance notice was given. Yet four employees ignored the rule. The company suspended them for five days and the arbitrator supported the company. "Obey first, file a grievance later," he said.

There is only one time when an employee can disobey a rule—when he is asked to do a hazardous job or act criminally. And even in these instances he acts at his own peril—that is, he must be right in assessing the result of his compliance.

How to Handle 11 Common Disciplinary Cases

Each problem in discipline is different. To handle it properly and to make your decision stick, you'll need to consider more than just the basic principles. You must also apply the special techniques that have been demonstrated successfully by others faced with similar, specific situations. Here are guides for action in 11 especially difficult situations:

1. The Absentee



The patience of plant executives is sorely tried by the employee who fails to notify the plant of his inability to get to work or his intent to stay away. Equally irksome: the chronic absentee.

To make a discharge stick for failure to notify the plant of absence, the company must have a standard reporting procedure known to all workers—when to call, whom to call, what happens when there is no call. Difficulties arise when the procedure is incomplete.

Example—The contract at Goodyear Clearwater Mills in Georgia required employees who were unable to work to report this in advance. One employee who was sick had no telephone. When the car pool rolled by, he had his brother-in-law call to one of the men to relay the news to the plant. Arguments on whether the absence was reported ended in confusion. Fact was, the company laid this worker off for a week.

The arbitrator upset this penalty. He reasoned that under this clause the employee had performed his duty when he employed a means of reporting that was, under all the circumstances, reasonable and calculated to result in receipt of notice. The arbitrator distinguished this situation from that existing under contract clauses that state, "The company must receive notice." Under the latter language, the result might have been different, he implied. Moral: Watch your contract language.

Where there is a set procedure, you'll find arbitrators pretty much agreed that it ought to be followed to the letter.

Example—The contract of the Sivyer Steel Castings Company provided for loss of seniority after three days' absence without notice. The penalty was upheld in the case of a jailed employee who failed to advise where he was until five days after he was jugged.

The fate of the chronic absentee is sealed. Fire him. Arbitrators say an employer is entitled to full services of his workers except for reasonable time off for illnesses and to perform the usual obligations of the human race, such as attending the funeral of a close relative.

But when the reasonable becomes so unreasonable that the plant executive feels he's operating a home for the feeble or a spa for homework-worn employees, the employee can be lopped off the payroll with arbitrator blessing.

Example—In ruling on the discharge of an employee of the Aspinook Corporation plant in Rhode Island, the arbitrator indicated that the company was under no obligation to keep an employee who was so habitually ill or suffering from injury that his services were worth little. This arbitrator wrote the following Magna Charta of plant discipline:

"The profitable operation of a plant and the consequent economic well-being of the employees of that plant depend on the regular attendance of employees. A plant cannot operate without assurance that its employees will come to work. The disruption of work schedules because of the necessity of replacement of the absent worker places a serious burden on the company in planning its production.

"While conceding that long service entitles an employee to special consideration, on balance, interests of the company and its working force, as a whole, outweigh interests of the individual employee."

Big unknown for the employer going into arbitration on chronic or excessive absenteeism is: How many absences does it take to make it chronic or excessive? A flat rule here would be helpful—but we know of none. For what it's worth, arbitrators usually consider the following factors, assigning varying weights to each:

. . . *Over* how long a period was the employee absent?

. . . *What* kind of job was he absent from?

. . . *Were* there other employees with similar records?

. . . *How* were these other employees handled?

. . . *What* steps did the employer take to help improve the employee's record?

. . . *Did* the employee receive ample warning before he was fired?

In weighing these factors, some arbitrators have even said that the reasons do not really matter if there have been so many absences that the employee has contributed little work to the company.

Example—The arbitrator paid little attention to the reason for the absence of an employee of Jenkins Brothers. He was fired when he was jailed for 45 days. The union demanded the penalty be withdrawn. It argued that the conviction didn't affect the employee relationship, that the union contract said nothing about a jail sentence as proper cause for discharge. But as far as the arbitrator was concerned, the employee was absent for an extended period without cause—that was enough for him to rule in favor of the company.

Example—An employee of Hoffman Beverage Company had a tough time at home. He had a mentally sick sister and a sick father. Because of this, his job presence record was bad. In nine months he was able to work only 88 days. But the arbitrator said discharge was justified. One "can sympathize with the heavy personal burdens Jones claimed he assumed . . . The company, nevertheless, has been extremely patient and tolerant and is certainly now justified in calling a halt to its unsatisfactory experience with Jones."

Example—Another arbitrator felt that normally a discharge without careful consideration of reasons should not be countenanced. But in the case of the National Union Radio Corporation he upheld the discharge because the employee had ample warning.

Warning employees of probable discharge is important in your case on excessive absenteeism—plus the efforts of the plant executive to get the vagrant employee to improve. Dutch-uncle talks seem to be prescribed. Also important to your case is any laxity in enforcing a rule against chronic or excessive absenteeism. Don't let absences accelerate until BOOM—you are confronted by an employee with a bad record and you must fire him at once. Sudden enforcement of such a rule after a period of laxity will wreck your case (not to speak of what such laxity may do to your plant). Another case wrecker is any similar instance of excessive absenteeism on the part of another employee which, for one reason or another, you may have overlooked.

Example—The arbitrator reviewing a discharge by the South Bend Lathe Works found that "past practice existed to reinstate employees who were absent in the face of the denial of permission to leave when the employees had good records. The employees were not notified that an absence during the 1949 inventory would be a cause for discharge action and had a right to rely on this past practice of leniency . . . The company, however, has a right to issue a warning notice of discharge action for failure to work during inventory time. In the absence of such a statement, the practice previously established must be controlling."

2. The Loafer

High on the list of costly plant misdemeanors—perhaps higher than chronic absenteeism—is an employee who's on the job but not working when he is there. As opposed to absenteeism, you are paying for work not performed. But strangely, loafing is one of the hardest offenses to hang an employee on. The company must show that more was involved than an occasional chat with the fellow on the next machine, a casual visit down the aisle, or an accidental overstay of rest period. Trouble is, the wised-up employee knows just how far to go before he becomes a candidate for the carpet. Where loafing is involved the company must show that production was adversely affected, that the infractions were habitual or chronic, and in most instances (at least before the discharge penalty can be invoked) that the employee received ample warning.

Almost equally tough to prove is that an employee slept on the job. It's tough because of the nature of the offense. The employee gets the benefit of the doubt in 9 cases out of 10.

Example—The director of a Century Foundry Company plant noticed an employee stretched out on his back, with his head and arms leaning against a truck. He was motionless. His eyes were closed. It looked to the director that this employee was asleep. When the employee was fired and the case came before an arbitrator, the "sleeper" said he was merely resting. The arbitrator fell for it. Said that the company hadn't proved the employee was asleep.

Looking at the awards of arbitrators you may conclude that mere idleness or closed eyes are not enough. You need corroboration. For example, you may have to waken the fellow—or hang around until he awakens. This might help. In the Century Foundry case, the director let the employee sleep on. He went to get the foreman. By the time the foreman arrived the employee had awakened—or, as the arbitrator might have said, he stopped resting.

But there is a ray of hope. Some arbitrators don't fool easily—nor are they concerned with semantics.

Example—In the Esso Company case the arbitrator stated that it didn't matter that the employee was not asleep. He reasoned: Why waste time trying to prove the employee was asleep when "he was at least in the relaxed position where in another second or two he might have been asleep. The gist of the offense of sleeping is that it deprives the company of services it is paying for. He started neglecting the company's business when he started the relaxation that is the beginning of sleep." Makes a lot of sense!

3. The Sub-Par Man

Before you can nab an employee for doing a poor job you must show that your plant has reasonable standards of performance for that job. And then you must show that the employee didn't meet them. Just your say-so or that of your foreman may not be enough. The best case is made when you can present the arbitrator with worksheets, production records, and examples of off-standard performance.

But this is just a starting point. You must also be able to show that the poor performance was entirely the fault of the employee. A penalty may not stick if the employee has not received proper training. Nor will it stick if the employee was given a job that was 'way over his head. Finally, you must be able to controvert any union argument that the machine or materials were

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"A penalty for poor performance may not stick if

partially to blame or that supervision was inadequate.

Example—The supervisor's instructions at the Kraft Foods Company, Chicago, were not clear-cut enough, according to the arbitrator who heard the case. The supervisor said he said, "Clean up the machine." The worker said he didn't say that, but did say this: "It's all yours—I'm going home." He made no specific mention of cleaning up the pasteurizer. The arbitrator ruled that the penalty imposed against this employee, who left his job without cleaning up, should be reduced from discharge to a two-month layoff. True, failure to follow instructions could have caused damage to the machine. Still discharge was too severe, he felt, when one considers that the instructions were not clearcut, the employee had been with the company for 10 years, and no complaint had ever been made about his work in this department.

Example—In an award involving the Kraft Foods Company, Wausau, Wis., the arbitrator upheld a discharge but ordered severance pay for the employee. This, he believed, was due the employee because she was inspired to disrespect the job by her supervisors, who were regularly engaged in horseplay during working hours.

Another difficulty you may have to face is the supervisor who leads an employee to believe he can get away with sloppy work, then in a mad mood decides to turn him out. This sort of discharge is often disallowed.

Example—The arbitrator who heard the case of the Art Chrome Company of America found the company had been negligent in allowing inefficiency to continue over a long period without correction. He also found that supervision was inadequate and that this employee had never been threatened with discharge or warned to improve. The employee was reinstated on probation, without back pay.

Arbitrators consider the past service record of the employee, too. That is, when they find that the employee on the carpet has a long service record, they seem to struggle for some reason to negate or mitigate the penalty. Thus the longer the employee has been with you, the better your case must be.

Example—An employee of one company had voluntarily resigned some long time ago. But later he was rehired at an increased rate. He had been employed for six years before he was fired. The company argued that it was a small company and not strong financially, that this employee was unable to perform several functions of the job, and that he could produce at only half the normal rate. The company's concluding argument was that if it were compelled to keep this worker, ultimately it would be forced out of business. A pretty strong case for the employer!

Even so, the arbitrator ordered reinstatement. He considered these factors: The employee was aged. He had been with the company a long time. He performed his major function competently. It would be almost impossible for him to find another job. But he was to be reinstated at half-pay, a rate that would be in accord with his production.

4. The Careless Man

Closely allied with poor performance is employee negligence. Much of what has been said earlier is equally applicable here. Negligence cases usually involve damage to machinery or injury to a fellow worker. An important question appears to be: Was the employee or the machine at fault? You must be prepared to prove that the employee was at fault beyond any reasonable doubt.

Example—After an accident at an American Smelting and Refining Company plant the employee said the motor started up accidentally when he tried to straighten out a cable he was winding on a drum. He lost the tip of his finger. The company insisted this was impossible. Couldn't happen. But there weren't any witnesses. The discharge was not sustained. "Discharge for negligence is a serious charge upon a man's employment record. There should be positive evidence beyond a reasonable doubt to sustain it."

Furthermore, in arbitration it's not just any ordinary carelessness:

Example—An employee of the Oil Center Tool Company was fired for negligence after a large turret, which he had rigged and lifted with a crane, fell and caused serious damage. "Reinstate him with back pay," the arbitrator said. There was no question in the arbitrator's mind (hindsight is better than foresight, he admitted) that the operator could have been more careful. But he did act with reasonable ordinary care in the light of his previous lifting experience and the practice of others. His action wasn't negligence in the sense that should result in discharge.

5. The Name-Caller

Insubordination ranges from the vigorous to the mild. Insubordination of sorts may be tolerated—even anticipated—from rough, tough production workers. That being so, arbitrators discount mere personality conflicts between supervisors and workers. It's when workers become too rough-and-tumble that you have a case—but usually one that is not too easy to prove. Question: How far is too far?

Example—One important gray area is profanity or abusive language. Unions usually protect the worker here. They fear that management's prerogative to discipline employees who use filthy and profane language may cause an otherwise good employee to be fired for using such language in a harmless or kidding way. The arbitrator in the Cities Service Oil Company case felt that management has the right to fire an employee when

the employee was not properly trained for the job"

the language is used in an insulting way—but not if used in a friendly fashion. His opinion: Industry would lose too many good workers if this were not the rule.

Example—Several NLRB and court cases have drawn the line between the proper and the improper. There's a time and place for everything, including name-calling, says the NLRB. For example, in the Bettcher case, the NLRB okayed a worker's calling the boss, at a collective bargaining session, a juggler of company books. This was part of the give and take of bargaining. But in the E. A. Laboratories case it ruled that if the worker does the name-calling in front of the plant gates while passing out leaflets, he's on his own. He has no legal comeback if you fire him. In this case the employee passing out leaflets called the boss a "Fascist" and "Fascist lover."

But even in collective bargaining sessions the NLRB has ruled: "A line must be drawn between those cases in which an employee acts in a moment of 'animal exuberancy' or in a manner 'not activated by improper motives' and those cases in which the conduct is so violent or so offensive as to render the employee unfit for further service."

The ink was hardly dry on this ruling when a Federal Circuit Court of Appeals in the Atlanta Towing Company case further limited a worker's right to call his boss names. In this case, a worker falsely stated at a union meeting that his employer had violated the labor law. The court ruled: The company had the right to fire the employee for making the statement. Whether he knew the statement was false didn't matter. Arbitrators will no doubt rule similarly upon similar facts. At least they should.

6. The Rebel

Few gray areas here. You can almost count on it: When an employee refuses to accept a job assignment, you can penalize him. In fact, arbitrators have clearly proclaimed: Unless it's a hazardous assignment, or one that the employee's doctor says is injurious to his health, or one that violates some law, the employee must accept the task and grieve later—even if employee and union feel the union contract is violated.

But there are many cases involving employees' refusal to work overtime. Employees like overtime but they'd like to be able to choose when. So would management. Most union contracts have overtime assignment clauses generally surrounded with safeguards stating when it can be required, how it must be shared, how much advance notice need be given, and so on. These clauses are strictly enforced.

Example—The arbitration board hearing a dispute involving the Glamorgan Pipe Foundry Company of Virginia solemnly declared that a refusal to work overtime violated the no-strike clause. Glamorgan workers had indicated they'd work a 10-hour shift, instead of the usual eight. In fact, they had been working the longer shift for several months. Then one day they told the employer they were quitting at the end of eight hours—and did. The arbitration board felt the men were obligated to work the full 10 hours. Not doing so constituted an unauthorized work stoppage—in effect, a daily strike, two hours long.

When the union contract is silent about overtime, arbitrators will seek a custom or past practice to support a penalty. A rule, however, is good if it is the right rule.

Example—If you have a rule or a clause like the West Penn Power Company's contract had, you're better off without one. One weekend 14 employees turned down a Sunday assignment. All were suspended. Insubordination, the company said. The parties went to arbitration. The company clause read that it could "request" employees to work overtime. "Request" was the culprit that scuttled the ship. The arbitrator agreed that an employer had the right to compel his workers to work reasonable amounts of overtime. But the company threw this right away by its poorly phrased contract clause. The implication was that the employees had the right to refuse to work overtime—which they did.

7. The Wildcatter

Arbitrators don't countenance strikes, slowdowns, or walkouts when they violate a no-strike clause. The supreme penalty of discharge is in order, they say. When you find that an employer loses a discharge case, the odds are it was because he failed to prove that the penalized employees actually were responsible or involved. Or you may find that the losing employer had such an unwholesome record of anti-unionism that the arbitrator considered the discharge penalty an excuse to get rid of the undesirables.

Another case loser arises from the way in which you impose penalties. You can lay a heavier penalty on union officials who inspire or encourage a wildcatter. These officials are expected to have a higher degree of responsibility than the rank and filers. But you cannot be selective, as a rule, among the rank and filers. You ought to handle them uniformly. But there are several instances where selective penalties among such employees have been sanctioned.

Example—Take the case of the Goodyear Atomic Corporation plant. Grievances had been piling up for some time. One fine afternoon some workers walked off the job in protest. Before the day was out a total of 300 workers had walked off. The union officials tried to get them back—but failed. Finally all the workers returned. The company felt it wasn't practical to fire all those who took part in the illegal strike. What could it

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"...invoke discipline to maintain standards"

do? It decided to lay off for two weeks the first 48 employees who had walked out. This was discriminatory punishment, the union claimed.

The company answered: "Under the contract we could have fired all workers. We can impose a lighter penalty on fewer than on all. Besides, some punishment is necessary to avoid recurrence of wildcat strikes." The arbitrator ruled in favor of the company. His reaction: This was a mild penalty when you consider the seriousness of a plant shutdown.

8. The Pugilist

Taking a swat at the boss—on or off the job—can be fun (if you can get away with it). But employees will hardly ever get away with it on the job—and will not always get away with it off the job.

An arbitrator once said: "Over the years it has become an established principle that an employer can sever employment relations for activities such as fights outside the plant during non-working hours if these activities are intimately or directly connected with some incident that occurred at the plant. Therefore it is proper to discipline an employee for an assault on a supervisor off the company property if the employee is the aggressor and the fight is the result of employer-employee relations or company affairs, or is a carry-over of trouble in the plant. On the other hand, an employer cannot fire an employee for fighting a supervisor outside the plant during non-working hours if the evidence fails to prove that the employee threatened the company official during the time he was working or during working hours."

That appears to be the rule. The company—and the union—have the right to expect that their officials will not be subject to harm or physical violence because of labor problems.

Example—This rule was applied to a Southern Bell Telephone Company operator who filed a grievance about a demerit that had been handed out by her supervisor. She won the grievance but her pride still suffered. After the grievance meeting she followed her supervisor home, stopped her at the steps, and demanded, "Take back what you said at the meeting." "No comment," appeared to be the supervisor's response. The inevitable hair-pulling began—with the equally inevitable result that no one knew just how it started or who for sure was to blame. But the company sided with its supervisor, put the blame on the operator, fired her. The arbitrator supported the company.

Arbitrators will not underwrite belligerency off the job under such circumstances. Nor under circumstances that, for example, may adversely affect the company's public relations.

Example—Standard Oil Company of California promoted a driver-courtesy program over a period of years. A company truck driver had a traffic accident. In the inevitable discussion that followed the driver assaulted a member of the public. This wasn't the first time he had been discourteous. He was, therefore, discharged. His discharge was sustained. The board said: "The expression 'Where the hell do you think you're going?' is not a simple request for information. It is an invitation to an argument and implies an abusive and antagonistic attitude. Behavior of this type on the part of truck drivers is not uncommon. But this company has succeeded in putting its drivers on a different plane. By selection, by training, by rules, and by discipline it has established good public relations as part of the job requirements for truck drivers. It is entitled, therefore, to invoke discipline to maintain the established standards."

None of this means, however, that when one employee is approached by a fellow employee—even in the plant—with a monkeywrench in his hand and a gleam in his eye that means business, he must say, "Lay on, MacDuff."

Example—The arbitrator in the Consolidated Vultee Aircraft Corporation case reiterated the principle that no company rule can be construed in such a way as to deny the employee the right of reasonable self-defense. Strictly speaking, then, the non-aggressor should go scot-free. This has happened. But it is a rare fight when the other fellow is not partly to blame. Thus is born the rule that the aggressor might be assessed the tougher penalty—while a more lenient one is handed out to the aggressee.

This happens to be one of the areas mentioned previously in which the company needs no posted rule. It is assumed that a mature person knows fighting is taboo. The discipline situations discussed as Nos. 10 and 11 fall into the same category.

9. The Drinking Man

Drinking should not be management's concern unless there is a direct relationship between intoxication and business, the job, or public relations. So rule the arbitrators. Otherwise, employers must play hands off. But if business, the job, or public relations are factors, the employee need not be a roaring drunk to justify a discharge.

Example—One arbitrator approved the discharge of an employee who drank once in a while on the job—but never did so excessively. His supervisor and fellow employees had complained about whiskey on his breath. He was a commercial representative of the Southern Bell Telephone Company, thus came into contact with the public—women in particular—who might find his breath offensive. There was a direct relation here between drinking and the company's public relations. Except for that angle, the discharge might not have been upheld. As a rule the mere smell of liquor on an em-

ployee's breath doesn't necessarily indicate to arbitrators that he was drunk. Proof of the alleged drinking or drunkenness must be clear.

Example—The Wesson Company fired a bus driver who came to work in a condition that suggested he was drunk. The discharge was not sustained. The arbitrator found a suspicion of guilt. But there was no proof of guilt beyond reasonable doubt. The company's case was based upon his appearance. The company made no medical check-up of his condition nor had any of the passengers complained.

Example—The arbitrator hearing the Jones and Laughlin Steel Company case supported the employer's right to discipline solely on the basis of a guard's report that an employee had reported to work under the influence of liquor and therefore had been kept out of the plant. The company needn't make any independent investigation of the facts.

The arbitrator stated: "An employee who is under the influence of liquor is presumably unfit. . . The guard's decision to exclude an employee is (not) necessarily final and (is) open to question. Conceivably, a guard may seek to harass an employee for purely personal reasons by excluding him without real justification. Proof by the union of such a situation would certainly impel us to grant appropriate relief."

A lot depends upon the arbitrator you get, but more depends on the condition of the employee—what he did or didn't do when he was drunk, the nature of his job, how often he has been drunk, what his past record has been, and who and how many people can testify to his condition at the time.

10. The Gambler

Breathes there an employee—or supervisor—with soul so dead that he has never bet on a World Series game or a champion prize fight, or matched a dime or two? Management manages to turn its back on occasional examples of petty gambling. But management gets seriously worked up when gambling becomes so prevalent that it disrupts production—or when professional gamblers from outside the plant gate (or within, for that matter) influence the workforce.

Last year, the Associated Industries of Cleveland asked some of its member companies to describe their experience with plant gambling. All members agreed that it was not currently a problem, but all had developed policies about it, with assigned punishments. Arbitrators do not get especially excited about gambling either. They repeat these rules:

. . . *Evidence* must be clear and convincing.

. . . *You* cannot fire an employee for his first offense unless he is connected with professional gambling or unless he has been properly warned in advance of the probable penalty he will incur.

11. The Plant Thief

You'll find far more arbitration awards on dishonesty than gambling. Not because there is more thieving than gambling but because management can't afford to turn its back on thievery. In the eyes of arbitrators it's a serious business. Fire an employee for being dishonest, and you destroy his reputation in the neighborhood and his prospects for finding work elsewhere. Arbitrators thus want to be sure:

. . . *Was* he the fellow who did it beyond any reasonable doubt?

. . . *Did* he intend to steal it or be dishonest?

. . . *Was* the value of the stolen item negligible?

. . . *Were* there any extenuating circumstances?

Here, more than in any other area, arbitrators delve into extenuating circumstances, mitigate penalties.

Examples—An employee of the Helipot Corporation was fired for taking a truck canopy for his own truck. "Reinstate him without back pay," the arbitrator ordered. Sure, his action was grossly wrong. But the penalty should be reduced because the employee didn't realize the seriousness of the act. He had made no attempt to conceal the fact from the company, he had talked openly about it to other employees, and a leadman who saw him take it did not attempt to stop him but reported it to the company several days later.

Another arbitrator said that if the offender has a record of being a good employee, you can't fire him for taking copper scrap of little value, which he thought had been thrown out. Some lesser penalty ought to be imposed.

Examples—The arbitrator handing down the International Harvester Company award ignored the union contract. Although a discharge was okay under the contract, he recommended that the employee be reinstated because the material taken was worth only a few cents. To deprive him of his job and prejudice his future employment because of this one mistake seemed cruel and unnecessary. But it's not always this way. An employee of the same company admitted he hid a portable drill in a scrap pile with the intent of taking it home. But he said he later changed his mind. "You can fire him," said this arbitrator, because his previous intent and actions would constitute larceny at common law.

Suppose the dishonest act of the employee occurred off the premises—on his own time. The employee may have contributed to the delinquency of a minor, been thrown in the jug for being a hit-and-run-driver, or even been jailed for burglary. Is that reason for the company to fire him? As a rule, no. The company must show some connection between the outside offense and the job or the company. A truck driver could possibly be fired for an outside hit-and-run episode, but not a production worker. Perhaps a bank clerk for stealing a Christmas tree, but not a production worker.

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FACTORY
MANAGEMENT AND MAINTENANCE

IDEAS OF THE MONTH

By LEWIS K. URQUHART, Executive Editor, FACTORY

(For more information, circle item numbers on Reader Service Card next to back cover)

Duracene tracing film is a new drafting medium *(Keuffel & Esser)* that is virtually indestructible; cannot be torn; won't discolor, split, or crack from age or heat. Moderate cost makes it suitable for general drafting room use. **(291)**

All your lighting questions answered — in a new manual *(Champion Lamp Works)* designed to help you get the most for your plant lighting dollar. Covers recommended foot-candle values, fixture and lighting types, quick calculations, lamp life, incandescent and fluorescent operation—everything you need to know to improve the lighting in your plant. **(292)**

Signs while you wait with an automatic sign writer *(Reynolds Printasign Co.)*. A boon for training directors. Rent, if you like. **(293)**

Cool-R-Frig is a handy-dandy answer to coffee-break problems. It's a real 1-cu. ft. refrigerator built into a water cooler *(Sunroc Corp.)* that supplies both cold drinking water and 185-deg. water for instant hot drinks. Recessed door for extra refrigerated storage. **(294)**

Introduction to Data Processing is a primer *(107 pages, Haskins & Sells)* that meets the need for simplification and better general understanding of a technically complex subject. Free for the asking. **(295)**

Tool and fixture components *(PIC Design Corp.)* from stock. Clamps, swivel washers, jig, legs, jig buttons, etc. All stainless steel. **(296)**

Best toilet tissue yet is probably the new Waldorf *(Scott)*. It's single-ply, embossed with a quilted pattern. Costs no more. **(297)**

Variflex is a new trolley conveyor *(Freeman Industrial Service)* that may be easily lengthened, shortened, or re-routed. It's completely protected against dust, water, dirt, and grime because the entire system travels in an enclosed channel. Self-lubricating alloy steel wheels. **(298)**

Now hear this! you methods engineers: Chronomat *(Wakmann Watch Co.)* is a reasonably priced stopwatch with a built-in circular sliderule! **(299)**

"The American Economy" is a handsome, informative booklet *(McGraw-Hill)* for plan-aheaders. Subtitle: "Prospects for growth to 1965 and 1975." **(300)**

That new Lock-it Plug *(Yale & Towne)* is sure to go over big with your electrical maintenance men. It has a key-operated nylon safety bar which, in its locked position, sticks out far enough to prevent the entrance of the plug into an electrical outlet. Might just save a life. **(301)**

"Have Fun" is a vacation booklet *(National Safety Council)*. Shows employees how to plan vacations for fun, rest, and safe home-coming. **(302)**

Maintenance kit *(Smooth-On)* is what the doctor ordered for repairing smaller areas with aluminum epoxy cement or for patching with glass tape. Units of hardener and resin are packed in proper proportions for immediate mixing. **(303)**

Training—the Modern Approach *(Carmody Corp.)* describes basic principle, procedures, and integrated process trainers. **(304)**

Best floor mat we've seen *(Flexi-Walk Mfg. Co.)* is made of oak slats with rubber feet that grip the floor and provide an air cushion to walk on. **(305)**

65 articles on retirement are available at reasonable cost from a new reprint service *(Retirement Council)*. From them you can build an invaluable series for your company publication that will help you familiarize older employees with the idea of retirement, and help them overcome their natural fear of the radical adjustments they may be called upon to make. **(306)**

Sequel Lock is a "can't forget" system for doors, cabinets *(Safety Lock Corp.)*. Locks and keys operate only in a predetermined sequence. **(307)**

Clamp kit *(Punch-Lok Co.)* is primarily for making hose connections and repairs, but your maintenance will find dozens of other uses. Contains an assortment of 45 standard clamps and a locking tool. **(308)**

Dust-free assembly cabinets *(John Bass, Ltd.)* are pressurized to prevent contaminated air from entering. Also available: a "glove box" for use in operations that require a completely enclosed area. **(309)**

Make your own color code for steel bars, rods, crates, boxes, etc., with a free kit *(Crown Industrial Products Co.)*. Contains all the materials and information you need including gummed color samples. **(310)**

Automatic warehouse *(Pesco Products)* is based on palletized storage of goods. Will double effective static volume handled in a given area. Can be operated by one man using dial or pushbutton control. **(311)**

Filing space at a premium? Then you'll like a new low-cost shelf filing unit *(Equipto)* that holds 21 feet of films (more than nine standard drawers full) in only 3 square feet of space. **(312)**

More Ideas of the Month in Press Time Report following page 64

Settling tanks boost filter life

Our screw machine departments are in operation at least 16 hours a day. They use about 500 gallons of cutting oil a day.

Old way—Reclaiming cutting oils was too costly. After the screw machine operation, oils contained metal chips. In the first reclaiming step, oil went to a chip separator, where large metal chips were separated from the oil. Oil then passed through a separator that removed ferrous particles. Next step was filtering, then on to the storage tanks, where reclaimed oil was piped back to the machines.

The filtering system required four cylindrical paper or felt filters. We found each type filtered effectively for only a week. We first tried felt filters. But when cleaning them proved unsuccessful, we went to less costly paper filters.

New way—We found that a 24-hour settling period effectively settled out the sludge. We then built a 400-gal. cylindrical settling tank (photo, left) piped for drawing off the oil. Oil now goes through the chip separator first, then to the settling tank, on into the magnetic separator, and at last through the final filtering unit.

Gains—Filter life doubled, downtime and labor halved. Three man-hours a week saved.

8 Licks at Maintenance Costs

These days, more then ever, every little lick counts. You'll find (as Marchant does) that the little ones add up big if you keep right on chipping away.

EAGLE EYE is what maintenance operations at Marchant Calculators get every day. Why? Because we've found that a maintenance item that was insignificant in cost one day can become monumental overnight.

We're expanding rapidly. As a result, we have to wrestle with new problems every day. We put each one through the question wringer—Why? Where? When? Who? How? In the screw machine department, for example, we asked a question about reclaiming cutting oils (photo above): "Why change oil filters so often?"

Cost reduction in maintenance is directly related to the same old questions: Why do these jobs have to be so repetitive? Why won't this equipment operate according to manufacturer's instructions? We try to get answers and keep an eye on long-range savings—even at a large initial expenditure.

On these two pages and the next two are listed eight steps we've taken to cut maintenance costs here at Marchant. We've saved a total of 43 man-hours per week with these cost-cutters.

By DOUGLAS W. EGELSTON
Maintenance Engineer
Marchant Calculators, Inc.
Oakland, Calif.

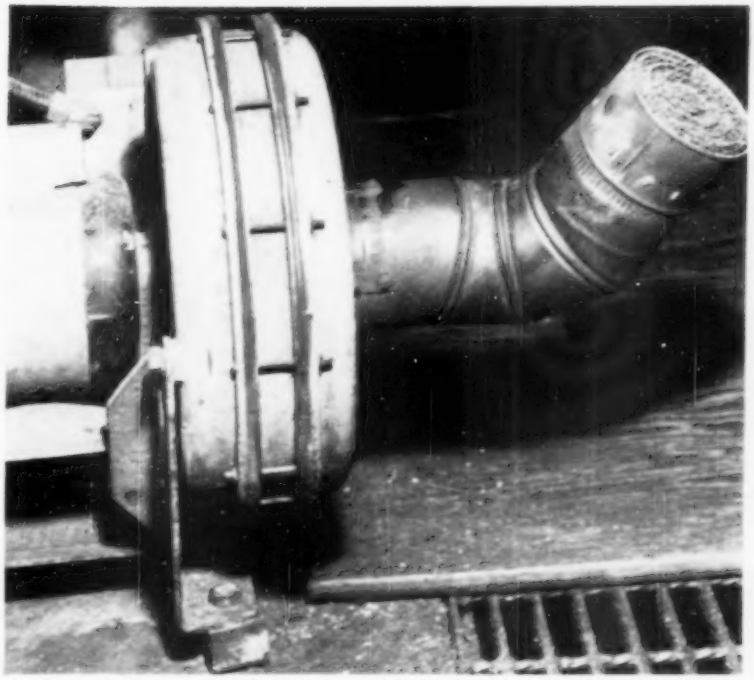
Filter elbow saves labor and materials

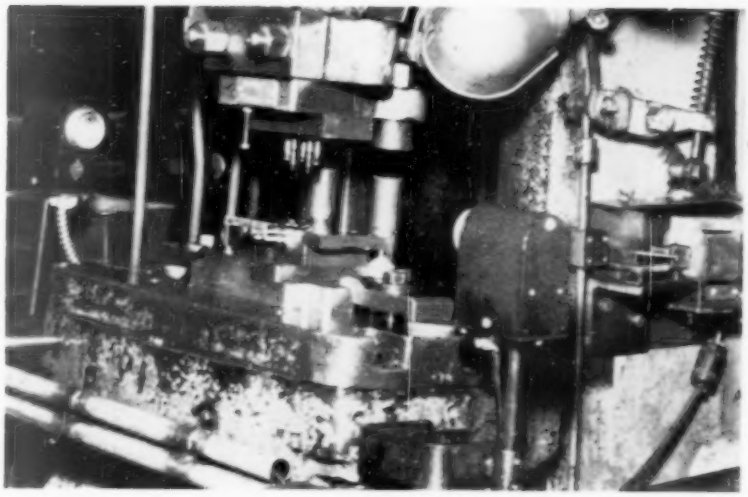
Why so much downtime in our heat-treat department?

Old way—Several blower motors provided air to be mixed with gas for heating the furnaces. Impellers became eroded and out of balance in two months. This required frequent bearing replacement and the maintenance of a costly spare parts inventory. Needed about six man-hours per replacement.

New way—We installed an ordinary stovepipe elbow, equipped with automotive filter-type copper mesh, on the air intake of each blower.

Gains—We've had no breakdown or downtime for the past 12 months. Only maintenance incurred is a 15-minute routine monthly cleaning. Labor and material costs are about one-fifth of our former costs. Two man-hours a week saved.





"Eyes" cut spare parts inventory 95%

How cut out trouble-shooting and downtime on our punchpresses?

Old way—We used an electric-eye circuit breaker for safety.

The design of these electric eye units made the mounting of the amplifier units on the machine impractical. Daily maintenance costs ran high—at times exceeded the cost of a new unit. And a large spare parts inventory was required.

New way—We installed a new system of electric-eye units (above, left). The new units, designed to withstand vibration, are mounted on the machines, thus eliminating the cumbersome floor-mounted set-up and the necessity for a second unit on most presses.

Gains—After six months' operation the new units needed no adjustment, and no broken leads have occurred in the past year. Complete operator safety is assured. Our spare parts inventory on this equipment has been reduced 95% and maintenance is at a minimum. Eight man-hours a week saved.

Clutch change slashes costs

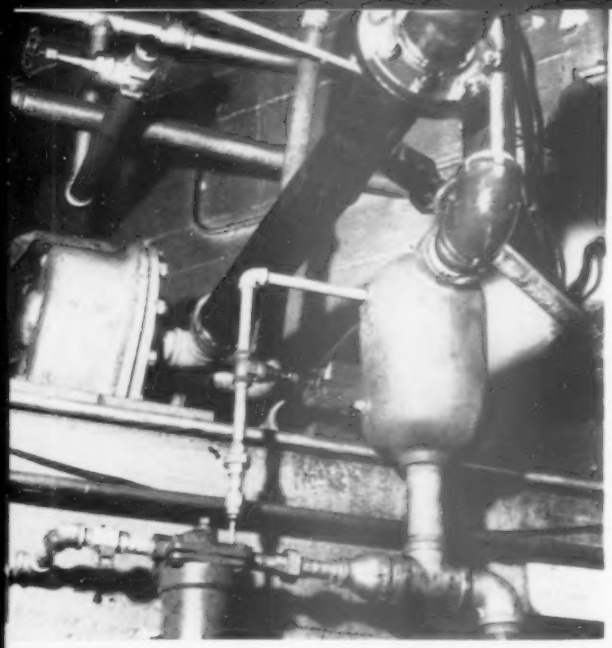
Old way—Our troublesome actuating clutch was the next problem to be tackled. Here the difficulty lay in the construction of the mechanism (a steel rod that moved vertically in a brass enclosure).

A safety energized solenoid moved the rod into a locking position. (A ball bearing locked the rod, prevented it from moving or releasing the press ram.) Excessive wear of the steel and brass parts meant major repair or complete replacement on an average of every three months.

New way—We designed a solenoid assembly (arrow, above) that operates heavy steel sliding plates. These plates perform the exact function of the former rod and ball bearings.

Gains—No repairs or replacements have been required after a year's operation. Eight man-hours each week saved.

Turn the page



MAINTENANCE COSTS . . . *Begins on page 90*

Moisture traps cut drying time

What to do about our main air-compressor aftercooler?

Old way—For a time we tried to make do with the old equipment, but increasing maintenance requirements were costing us on an average of three man-hours daily. The aftercooler was letting moisture into the air lines, overtaxing the capacity of the moisture traps, and allowing the parts being manufactured to become wet. (Some production equipment required air to eject parts after each operation.) Extra time was required to drain traps and dry parts.

New way—Logical solution lay in total replacement of equipment. The new aftercooler (photo, left), a coiled-tube type (Graham "Heliflow") equipped with automatic moisture traps, has eliminated our former trouble. And the aftercooler paid off in nine months.

Gains—Ten man-hours a week saved.

Monthly shutdown prolongs tube life

What to do about expensive repairs on our G-E induction heater? Normally we schedule an annual two-week production shutdown, during which maintenance inspects and repairs all operating equipment.

Old way—This annual inspection plus on-the-job attention was enough for our less critical equipment, and, we thought, for the oscillator tubes used in our induction heating system. But we began to suspect that a more frequent scheduled shutdown on certain equipment (including our oscillator tubes) would pay off in spite of lost production and would prove less expensive than an unscheduled emergency repair.

New way—Our hunch was right. Even though guaranteed for 1000 hours, we found a tube would break down after 400 to 600 hours. So we set up a more frequent shutdown (checksheet, right).

To justify this production halt, the maintenance department made a complete survey of the benefits of a short shutdown inspection or repair *vs.* mere on-the-job-attention.

Gains—Our new way has not only justified a short one- to two-hour monthly shutdown. It has also increased tube life as much as 600 to 2800 hours over the guarantee period. Operating cost of tubes has been cut at least two-thirds. Six man-hours a week saved.

INDUCTION HEATER INSPECTION CHECK LIST	Comments	
1. Turn off main plate circuit switch.		
2. Turn off main filament circuit switch.		
3. Wait at least 3 minutes after filament switch is opened before turning off coolant water supply.		
4. Check and inspect all contactors, relays, timers, etc.		
5. Tighten all screws, nuts, etc.		
6. Clean off rectifier tubes, check connections.		
7. Inspect rectifier blower and motor. (Clean, grease every 3 months)		
8. Tighten all hose clamps. Inspect for leaks. Inspect hoses for signs of weakness, etc.		
9. Check oscillator tube connections. Look for signs of overheating.		
10. Inspect water jacket and gasket for leaking.		
11. Make sure water is off, then remove zinc electrodes, inspect and replace if needed.		
12. Turn water on (16 gpm.) and inspect for leaks.		
13. Inspect oscillator tube blower and motor. (Clean and grease every 3 months.)		
14. Inspect filament rheostat for loose connections burning, etc.		
15. Inspect plate voltage top switch.		
16. Inspect, clean and oil cycle timer.		
17. Inspect tank capacitors for leaking etc. Wipe off.		
18. Inspect all condensers.		
19. Inspect water pressure switches (3).		
20. Inspect work-table transfer switch.		
21. Inspect water-quench solenoids.		
22. Clean off control panel (meters, lights, etc.)		
23. Clean off all insulators inside machine.		

Gun seals leaks, saves labor

How could we keep from spending big money for building maintenance —especially roofs—while erecting our new multi-million-dollar plant? Heavy California winter rains make a good roof a necessity.

Old way—We used to use hand-brush and mop methods for applying roof coating. But that system wasn't adequate, especially with the age and construction of our roofs. Costly leaks popped up soon after the repair job—costly in man-hours and materials.

New way—Spray gun was the answer. Unit consists of a pump and the gun. Pump requires at least 80 psi. for spraying roof coating. The pump unit is merely set inside a 55-gal. drum of roof coating. Hose carries the material up to the spray gun and roof. We get better results with water-base coating because it appears to withstand cracking better than oil-base coatings. Also water is used for thinning the water-base coating.

Gains—One repair job for a wing of the plant paid for the spray gun, and other jobs have saved hundreds of man-hours and material. Four man-hours a week saved.

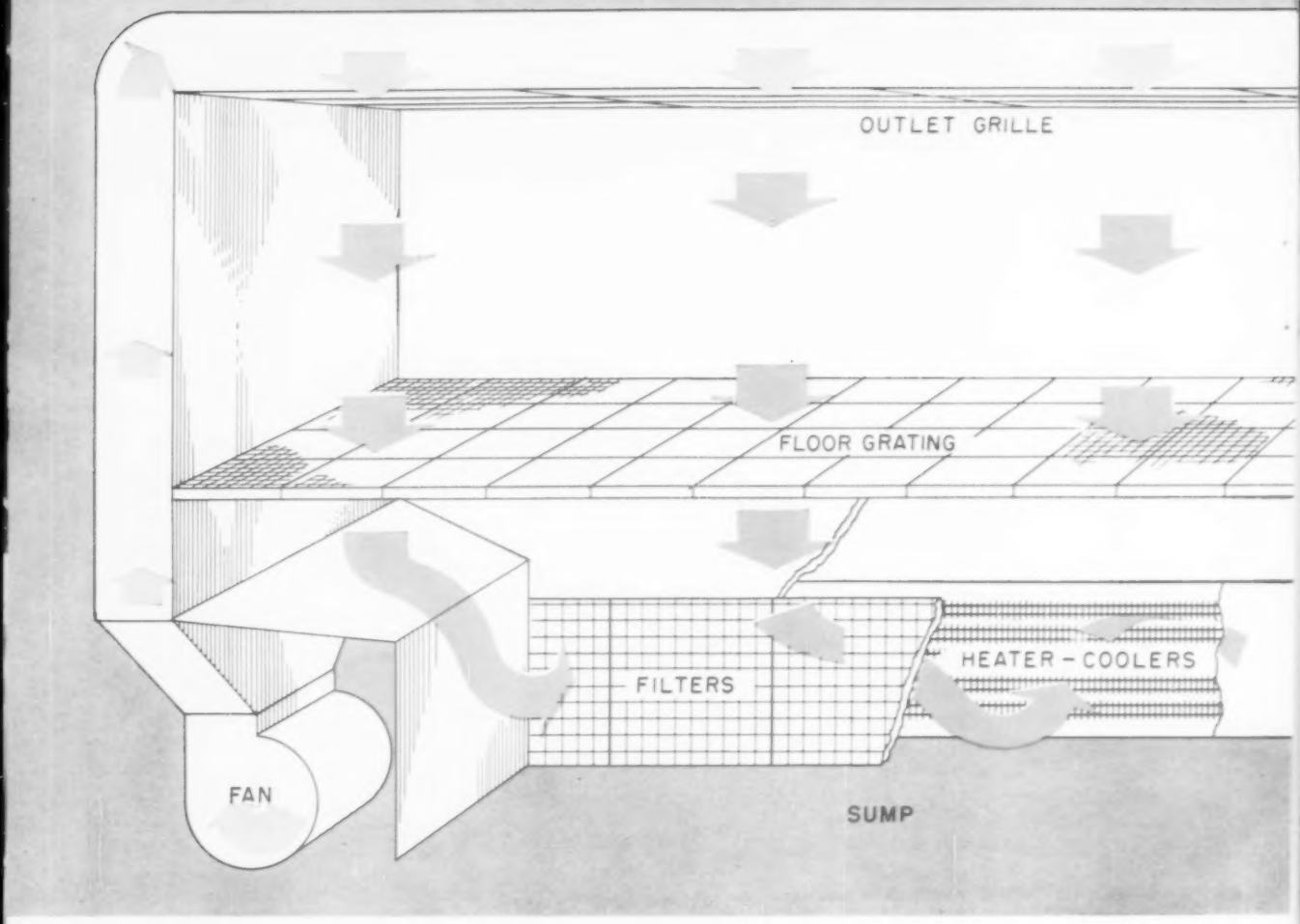
New ashtrays reduce cleaning

We answered the question "Who can clean the ashtrays?" Our answer eliminated a dirty and disagreeable job.

Old way—We were using a water-type ashtray that required cleaning by steaming and scrubbing. There was constant odor despite regular disinfecting and cleaning. We asked ourselves: "Why does it have to be water?"

New way—We switched from water ashtrays to sand (photo, left).

Gains—Now the regular department janitor cleans the trays. No special cleaning is required. Two man-hours per week saved.



Now—Doors Go Invisible

Newest door for plants is only a curtain of air. But it will seal off controlled-conditions areas, cut heating and cooling costs, speed plant traffic.

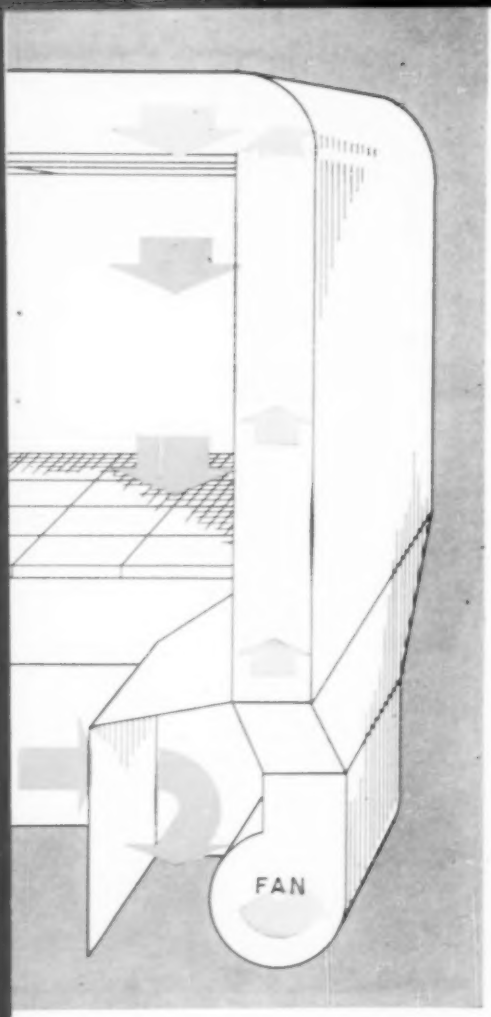
INVISIBLE door? You're looking at the design of one in the drawing above. It's a 1000-fpm. curtain of air that forms a temperature barrier. It's a Swiss idea.

Invisible doors are working today—have been for six years. They're in use on four continents. Already a substantial number of American banks, stores, groceries, specialty shops—even gambling houses—are using them. Their use in industry to isolate plant areas against temperatures, pressure, humidity, dust, smoke, fumes, and odors can't be far behind.

Heart of the doorless door is a 2- to 6-ft.-thick curtain of moving air that seals off an area almost as well as a conventional door. Yet an invisible door can't get in the way. You just walk right through it. Same for a fork truck. Or a conveyor belt. Or a mobile canteen.

So new is the application of invisible doors that only a few companies are in the business of designing and installing them. But to the Swiss engineering firm of Sulzer Brothers goes credit for developing and installing the world's first. Sulzer doors first went into a chemical plant and a department store in Switzerland in 1952. Yet frigid mountain temperatures didn't penetrate. For a good reason: A curtain of air is a prime insulator.

Invisible doors can also keep out insects—even dogs. Bugs just can't pierce the air curtain. A bug may buzz halfway through, but then he loses altitude, is dragged down through the grating at the base of the air curtain. As for dogs, a Reno gambling house installed an invisible door 41 feet long, then tried to entice a pack of hungry hounds over the grating with raw meat. The dogs wouldn't tumble. But a man can walk through the air curtain bareheaded — without discomfort.



HOW TO USE THEM

Imagine a plating operation with clouds of noxious fumes and gases. Right next to the fume source is a row of assemblers. Fumes don't get to them because an invisible door protects them. Sound fantastic? It isn't. These new doors can be installed in any shape—even circular. Will keep out anything up to a 15-mph. head-on wind.

What about a shipping clerk directing operations on a chilly loading platform, with workers just inside? With doors opening and closing all day long clerk and workers are either too warm or too cold. An invisible door will let trucks come and go, yet keep inside temperatures comfortable. Sulzer Brothers' plant in Switzerland has this sort of installation. No time lost in opening doors. Always comfortable.

Pharmaceutical plants with rigid sanitary requirements might use invisible doors to isolate special areas from airborne particles.

Or take a large packing house with bulky refrigerator doors thumping open and shut all day long. An invisible door can maintain inside temperatures, save the effort of opening and closing heavy doors each time a worker enters the refrigerated area. High cost of replacing rubber insulation on refrigerator doors (often a heavy expense) would be a thing of the past.

In chemical processing, invisible doors can maintain level humidity in a production area, while horizontal invisible doors can seal in the right temperatures and humidity in the holds of refrigerated cargo vessels during loading and unloading.

High-speed spray painting operations can be isolated from surrounding areas by enclosing the spray area with an invisible door. Odors not knocked to the floor grating can be killed by adding deodorizer to the air stream. And invisible doors between positive pressurized areas and regular areas (for dust control) can maintain pressure differentials up to 0.1 inch of water.

Here are some other things invisible doors can do:

. . . *Eliminate* congestion at doors during rush periods.

. . . *Cut* accidents caused by swinging or revolving doors.

. . . *Reduce* public liability insurance costs.

. . . *Save* space (for operations) that is now taken up by swinging or regular doors.

. . . *Let* people move around with greater ease.

. . . *Cut* loss of heat (through doorways) in winter, cut cool-air loss in summer.

WHAT THEY ARE

Invisible doors are curtains of air flowing at constant speed from overhead outlet grilles to a suction grate in the floor. Air flows at about 1000 fpm. The constant flow sets up a protective barrier against outside conditions.

Invisible doors stabilize pressure differences between inside and outside areas created by wind pressure or the "chimney effect" (cold air sucked in at the bottom of a building, hot air forced out through upper floor openings). Although even a tight building or room can't be tight enough to stop the chimney effect when doors are opened, an invisible door tones the effect down to almost nothing.

An invisible door has seven major parts: outlet grille (overhead), floor-level (intake) grate, plenum chamber, air filter, heating coils, blower, and supply duct (through which the air returns to the overhead grille).

HOW THEY WORK

The invisible door can adjust for weather conditions manually—or automatically—by means of a set of vanes in the overhead grille that adjust to the proper angle for greatest efficiency. In windy times vanes adjust the direction of the air flow at the outlet grille at just the right angle to compensate for wind pressure. Outgoing horizontal vector of the curtain is cancelled out by the wind vector blowing inward. Net result: Air curtain always goes straight down.

In winter a temperature control unit warms the air that forms the curtain to 100 F. In contrast, conventional double-door entrances to office buildings have to be heated by air blasts up to 130 F. In summer the invisible door works without special heating or cooling. Inside cooled air (in air conditioned areas) is recirculated by the invisible door grille and grate system. There is little heat gain from hot outside air.

All particles of dust or dirt are sucked through the grate and filtered out. Attachments such as ultra-violet lights can sterilize filtered air to assure sanitary conditions for specialized uses.

An invisible door reduces air-conditioning bills when it's used for an outside door because there's neither incoming cold air in winter to heat nor incoming warm air in summer to cool.

WHAT THEY COST

A 10-ft. wide invisible door costs about 10 cents an hour to operate in summer, about 50 cents an hour in winter (including steam for heat). Installation costs range from $750 to $2500 per linear foot of opening (depending on climate), the extent of remodeling, and the range of motor controls, grilles, filters, heating coils, and flushing devices.

PAY RATES FOR KEY INDIRECT JOBS—IN 9 CITIES

● All figures are average straight-time earnings in manufacturing industries except figures with asterisk, which are for *all* industries. They include incentive pay, if any, but *not* overtime, weekend, holiday, or night-shift premium.

Weekly earnings are average salaries for standard work week.

	MALE JOBS, EXCEPT WHERE OTHERWISE SHOWN	BALTIMORE AUGUST 1957	BOSTON SEPTEMBER 1957	DALLAS OCTOBER 1957	DENVER DECEMBER 1957	MEMPHIS JANUARY 1958	PHILADELPHIA OCTOBER 1957	ST. LOUIS NOVEMBER 1957	SAN FRANCISCO-OAKLAND JANUARY 1958	SEATTLE AUGUST 1957
		AVERAGE STRAIGHT-TIME HOURLY EARNINGS								
Maintenance and Power Plant Jobs	Carpenters, maintenance	$2.40	$2.27	$2.30	$2.53	$1.97	$2.57	$2.62	$2.75	$2.46
	Electricians, maintenance	2.54	2.48	2.41	2.56	2.51	2.62	2.76	2.95	2.59
	Engineers, stationary	2.39	2.45	2.22	2.51	2.34	2.32	2.71	2.94	2.41
	Firemen, stationary boiler	2.08	2.03	1.79	2.24	1.27	2.13	2.38	2.59	2.16
	Helpers, trades, maintenance	1.99	1.92	1.65	1.88	1.38	2.24	2.31	2.38	2.04
	Machinists, maintenance	2.71	2.45	2.45	2.52	2.50	2.62	2.82	2.87	2.61
	Mechanics, automotive, maintenance	2.27	2.44	2.04	2.41*	2.04	2.50	2.58	2.81	2.46
	Mechanics, maintenance	2.55	2.22	2.24	2.49	2.23	2.50	2.54	2.83	2.57
	Millwrights	2.50	2.31	2.32*	–	2.49	2.51	2.73	3.07	2.44
	Oilers	2.07	1.88	1.86	2.06	2.06	1.95	2.28	2.25	2.14
	Painters, maintenance	2.35	2.24	2.28	2.59	2.28	2.48	2.62	2.77	2.42
	Pipefitters, maintenance	2.59	2.39	–	2.62	2.68	2.66	2.76	2.86	2.44
	Sheet-metal workers, maintenance	2.57	2.45	–	–	–	2.56	2.74	2.78*	–
	Tool and die makers	2.80	2.63	2.54	2.70	2.77	2.72	2.89	3.15	2.88
Custodial and Material Movement Jobs	Guards	2.08	1.87	1.91	2.15	2.02	2.00	2.08	2.16	2.03
	Janitors, porters, and cleaners	1.73	1.64	1.47	1.72	1.42	1.71	1.73	2.05	1.79
	Janitors, porters, and cleaners (women)	1.31	1.39	1.23	1.51	1.25	1.42	1.50	1.92	1.57*
	Laborers, material handling	1.83	1.64	1.50	1.89	1.39	1.83	1.89	2.13	2.01
	Order fillers	1.52	1.83	1.78	1.93	1.55	1.81	1.87	2.30	2.14
	Packers, shipping	1.79	1.69	1.51	1.68	1.58	1.77	1.88	2.19	1.98
	Packers, shipping (women)	1.13	1.40	–	1.36	1.10	1.70	1.59	1.65*	1.70*
	Shipping clerks	2.04	1.98	1.96	1.92	1.81	2.13	2.18	2.31	2.18
	Shipping and receiving clerks	1.85	1.89	1.88	1.92	1.69	1.89	2.04	2.39	2.19
	Truck drivers:									
	light (under 1½ tons)	2.24	2.06	1.51	1.80	1.14*	2.29	2.21	2.53	2.14*
	medium (1½ to and including 4 tons)	1.94	2.14	1.56	2.10	1.57	2.34	2.51	2.59	2.40
	Truckers, power (forklift)	2.13	1.95	1.77	1.97	1.68	2.00	2.10	2.27	2.08
	Truckers, power (other than forklift)	2.24	2.01	2.13	–	1.92	1.89	2.01	2.54	2.10
	Watchmen	1.44	1.58	1.39	1.50	1.20	1.68	1.73	2.01	1.87
	FEMALE JOBS, EXCEPT WHERE OTHERWISE SHOWN	AVERAGE STRAIGHT-TIME WEEKLY EARNINGS								
Office, Professional, and Technical Jobs	Comptometer operators	67.50	63.50	68.50	65.00	66.00	64.00	64.00	74.00	70.00
	Draftsmen, senior (men)	108.50	104.50	91.00	98.50	109.50	104.00	113.00	110.00	95.50
	Draftsmen, junior (men)	78.50	79.00	74.00	75.50	69.00	82.50	83.00	87.00	72.00
	Duplicating-machine operators	65.50	53.00	61.00*	56.50*	–	59.00	57.00	67.50	54.50*
	Key-punch operators	66.50	59.50	66.00	68.00	64.00	63.00	62.00	72.00	67.50
	Nurses, industrial (registered)	87.00	76.50	82.50	83.00	77.50*	83.00	80.50	90.00	90.00
	Office girls	46.00*	56.00	56.00	47.50*	47.50	50.00	50.50	61.00	62.50
	Payroll clerks	67.50	62.00	66.00	68.00	62.50	66.50	62.00	81.00	75.00
	Secretaries	82.00	74.50	80.00	81.50	67.50	81.50	82.00	90.50	86.00
	Stenographers, general	72.00	64.00	73.50	70.00	63.50	67.00	65.00	78.00	72.00
	Typists, class A	66.00	57.00	63.00	61.50	60.00	67.00	65.00	76.50	68.50
	Typists, class B	61.00	54.00	59.00	55.50	51.00	54.50	57.00	65.50	61.50

Indirect Wages Still Higher

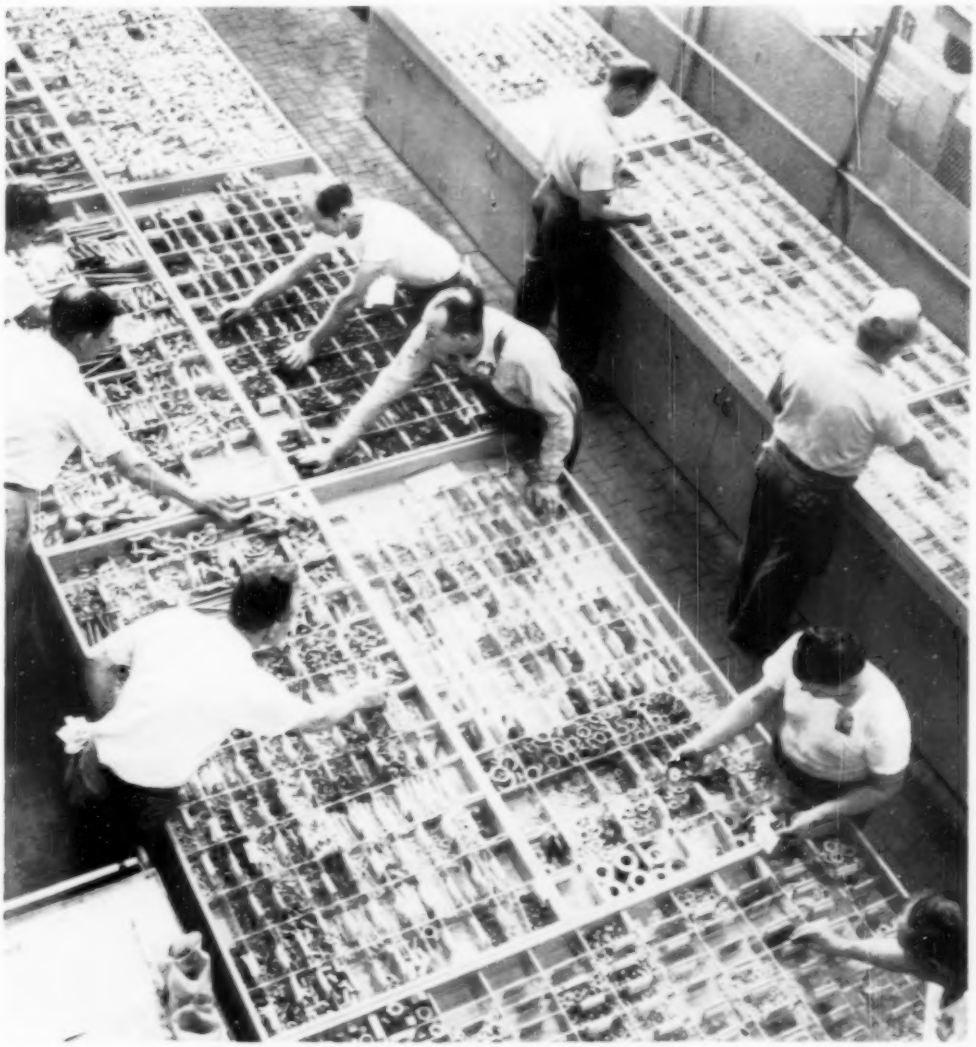
HIGHER rates for wages and salaries of indirect employees are still the trend, according to FACTORY's latest exclusive report from the Bureau of Labor Statistics, U. S. Department of Commerce. For instance, rate for maintenance machinists in San Francisco-Oakland in January 1958 was $2.87; a year earlier, $2.71. To check trends in the above classifications in your area, see previous BLS studies reported exclusively in FACTORY in May and Aug. '57; May and Aug '56; May and Sept. '55; April and Aug. '54.

FACTORY
MANAGEMENT AND MAINTENANCE

PLANT OPERATING MANAGEMENT

CASE BOOK

WARREN J. KING: EDITOR



NOT A 5-AND-10, BUT A SELF-SERVICE MAINTENANCE STOREROOM . . . SEE PAGE 99

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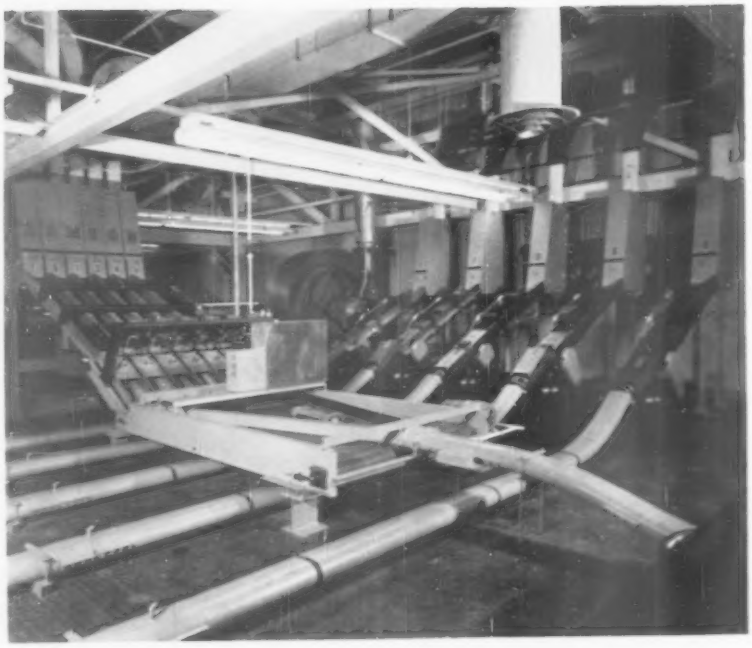


Automatic Switcher

This is a central switching station for a 30,000-ft. pneumatic tube system. It's installed at the new Automatic Electric Company plant (Northlake, Ill.) Occupies 840 square feet on a specially built overhead platform.

This pneumatic tube system has 36 stations. Uses 4x7x14-in. oval carriers with payload capacities up to 5 pounds for fast, point-to-point transfer of papers, reports, etc. Designed by Lamson Corporation (Syracuse), it cost $217,000.

Address dials on the end of each carrier connect side contact bars in various combinations to provide routing instructions. Contact brushes in tubes read address bars, actuate deflectors along the tube system, thus guiding carriers to the proper destination as they move along at 1500 feet per minute.

In the photo, the six numbered tubes (left) are the ends of the "sending" tubes which bring carriers to the switching location from 36 dispatching stations. Conversely, the five lettered tubes (right) are "receiving" tubes which take carriers to their final destination.

Here's what happens when a carrier arrives at the automatic switching center. It's fed by gravity from the sending tube down a chute to a belt conveyor. As the carrier leaves the chute, it passes over a set of brushes. The latter pick up the destination address from the carrier and through associated relays guide it to the proper receiving tube.

The belt conveyor takes each carrier to a single routing tube (center). This sweeps the carrier up and to the left. Feeds it to the designated lettered tube. The five lettered tubes serve 34 of the 36 receiving stations, have from six to eight stations each. The other two (for the mail room and the customer service department) are single, unlettered tubes. Undeliverable carriers (those improperly addressed, inoperative, or traveling in a reverse position) go automatically to the mail room for correction.

Box-like sections at the bottom of all chutes regulate traffic flow in tubes. These sections tilt-up at previously set intervals, thus preventing carriers from entering tubes right behind each other. This arrangement provides a 3-sec. interval on the numbered sending tubes and a 7- to 10-sec. interval on lettered receiving tubes.

Net effect is to prevent jams and give priority to tubes carrying the heaviest traffic loads. Also eliminates the need for senders to wait for a clear line before dispatching a carrier.

Self-Service Saves $105,000 a Year

(Cover Story)

May look like a five-and-ten-cent store, but it's not. It's the maintenance storeroom at the Air Force's Arnold Engineering Development Center (Tullahoma, Tenn.). Here self-service on high-turnover parts saves the Air Force $105,000 a year in man-hours alone.

Key to the new system is the worker himself. He estimates what he'll need in the way of parts when he starts a job. Then he helps himself and makes out a simple check-out slip showing what he took. That's all there is to it.

Each day 18 storekeepers total up the amount drawn from the 17 self-service centers in the previous 24 hours. Then they refill the bins. Formerly 39 storekeepers operated a series of supply rooms. Reduction in work force accounts for the annual saving of $105,000. Also the new system cuts paperwork.

Self-service parts are high-turnover items, include anything with a monthly turnover rate of 25% or more. Typical parts are screws, bolts, photographic supplies, electrical switches, washers, fittings, and pipes. Total value of the supplies: $176,000.

What about overdrawing? The Air Force reports that workers now take less than they did under the old supply room system.

Plastic-Lined Pool

Two giant polyethylene sheets store some 900,000 gallons of waste process waters temporarily at U. S. Industrial Chemical's (Ashtabula, Ohio) plant. One sheet serves as a liner, the other a cover to lock in odors that make storage in conventional pits undesirable.

Produced from polyethylene resin strips sealed together, the sheets are installed in a pit 150 feet long by 100 feet wide and 8 feet deep. Waste is pumped into the pit, then drained off after solids settle out.

The 6-mil film used contains carbon black to guard against adverse effects of ultraviolet rays from the sun. Rain waters accumulating on top seep through small drainage holes and into the bag. Holes act as vents for accumulated gases, too.

NEW PLANT IN AN OLD PARK

Architect, industrial designer, and landscape counsel "brainstormed" this new electronics plant for Square D Company. Result: It fits into the natural setting of an existing public park in suburban Milwaukee as though it had always "belonged." Building's long, low lines blend with the beauty of the surroundings. Rolling countryside extends right up to the front door. Offices and cafeteria overlook a man-made lake that supplants the conventional water tower.

Keeping the Shine on Aluminum Panels

Have you used aluminum siding on your plant for long life, low maintenance? Then found it was losing its luster? If that happened, either somebody goofed in not specifying the proper grade or alloy for a hostile ambient atmospheric condition that existed when the plant was built. Or somebody built a plant close by (after you got settled in a clear atmosphere) that now belches vapors harmful to the aluminum alloy originally specified.

What to do? Perhaps the same thing American Sterilizer Company did to both old and new sections at its Erie plant. It used a butyrate lacquer (Eastman Chemical Products) for added protection.

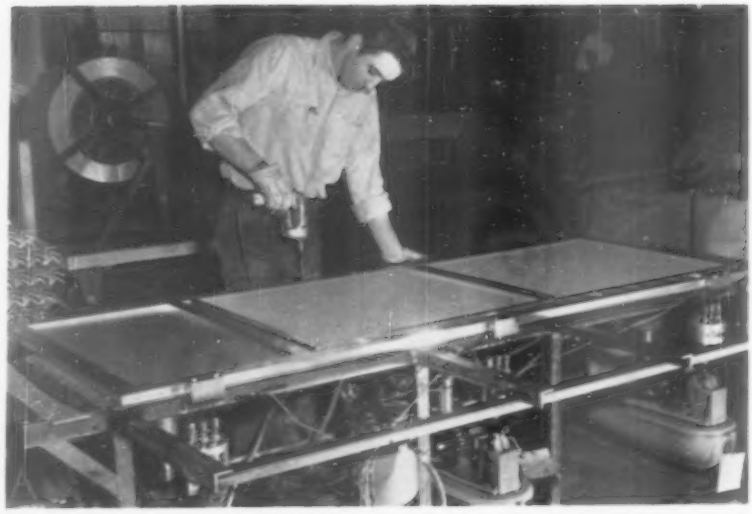
The American Sterilizer plant has aluminum wall paneling on virtually all sides. Also aluminum window frames and aluminum separator columns in the main façade. The building, occupying an area of 260,000 square feet, was built in two stages. One section was completed in 1953, the other in 1956.

On completion of the second section, it was noted that the metal-clad walls of the first section already showed the effects of weathering. Their dulling surfaces and the increasing accumulation of dirt and grime were evident in comparison with the fresh aluminum walls of the second section. To resolve this condition, American Sterilizer conducted a series of tests on sample wall panels in areas of maximum contamination. Tests showed that

Eastman's butyrate lacquer provided the added protection needed.

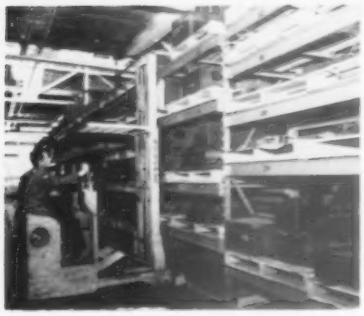
Before spraying lacquer on older sections, panels had to undergo cleaning, surface restoration, pretreatment. Purpose of these operations was to remove all oxides and soil, present a greaseless, clean surface for the lacquer.

American Sterilizer will be able to apply the lacquer to its new research and development wing more easily when it's completed this year. Here the protective coating will be applied as soon as construction work is completed but before weathering effects set in.



ONE MAN, THREE "HELPERS," DO FOUR-MAN TASK

Three multiple-head attachments on standard drills, plus a hand drill, make short shrift of drilling 12 holes in an aluminum screen door at Capital Products Company (Mechanicsburg, Pa.). As door rests in jig, three Delta drill presses mounted upside down cut nine hinge holes. Pneumatic cylinders actuated by a single pedal move these units up and down while oil mist lubricates and cools them. Meanwhile operator drills three doorknob holes with a hand drill.

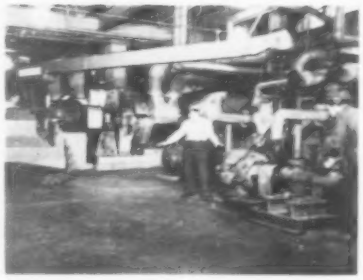


Making Better Use of Storage Space

A combination of three factors has made it possible for Pratt & Whitney Company, Inc. (West Hartford, Conn.) to increase utilization of tool and die storage space by over 83%. Now 801 units can be stored in an area that used to hold only 436. The company figures the floor area made available to production by the new set-up is worth $36,000. Total cost of the change-over—less than $20,000.

The three factors responsible for these savings:

- *New pallet racks* with vertically adjustable shelves. Each shelf accommodates two load-units with minimum clearance. This means that the maximum number of units can be stored in each rack section. These new racks (Rack Engineering Company, Connellsville, Pa.) replaced stationary shelving with 4-ft. clearances.
- *Six-in.-deep pallets* replace 14-in. deep steel skids.
- *A new lift truck* that can maneuver in an 8-ft. aisle loads and unloads dies and tools in racks (Moto-True Company, Cleveland). This unit approaches shelves at a right angle. Then its forks are extended 30 inches by a driver-operated hydraulic mechanism. Formerly a platform truck requiring a 15½-ft. aisle and a 12-in. skid under-clearance was used for this operation.



Cuts Big Move Jobs Down to Size

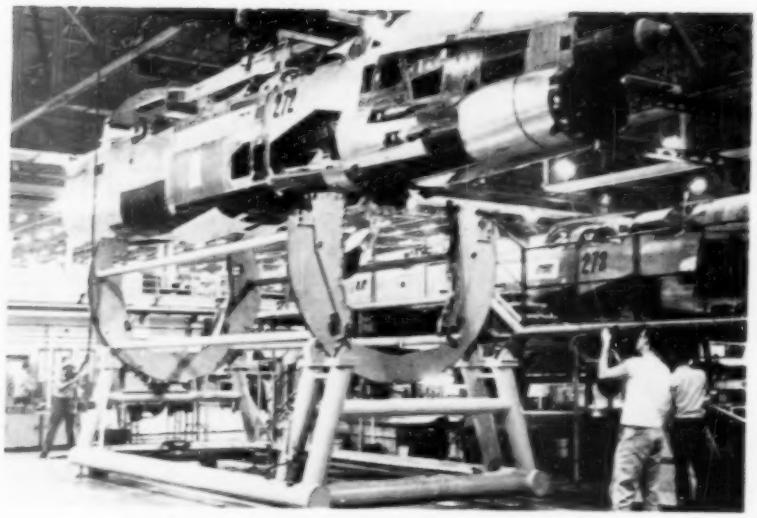
Moving 500-hp. motors and other heavy objects gets a big assist from mobile cranes at Delaware Power & Light Company's Delaware City plant. Inside maintenance jobs that used to take days now take hours. Outside jobs (like stacking poles in the yard) are no longer hazardous, and are quickly done. Cranes (Austin-Western Works of Baldwin-Lima-Hamilton Corporation), have four-wheel steering for narrow-aisle travel. Horizontal boom tilt allows unit to edge into squat buildings. Delaware Power uses the cranes for everything from humping railroad cars to digging automobiles out of snow drifts. Cost of operating company-owned crane: $5.75 an hour.

"Hot" Ball Spots Underfloor Leaks

Tricky underground pipe leaks hold no mysteries at Chevrolet Motor Division's Saginaw (Mich.) transmission plant. A floating radioactive ball tells technicians where water is leaking from a 400-ft. recirculation line under plant floor.

Quick spotting of the leaks recently prevented a production shutdown and plugged a daily loss of 8000 gallons of water.

First step was to inject a small amount of radioactive Sodium-24 into an ordinary sponge-rubber ball. Then the ball went into the drain



ROCK 'N' ROLL SHAKES OUT DEBRIS

They're about to lock this jet plane body into a fixture at Chance Vought Aircraft, Inc. (Dallas), and give it the rock 'n' roll treatment. It's a brand-new way of shaking out tiny pieces of metal, rivet heads, metal shavings, loose washers, and other debris that accumulate during assembly and might interfere with normal flight. Gear-train and chain-sprocket transmission (with 1-hp. motor) provides rocking motion. Fixture revolves 30 degrees every 10 seconds.

line after being weighted to float just below water level.

Technicians above the 9-in. concrete floor traced the ball's progress with Geiger counters. As long as the ball kept moving, everything was okay. When it slowed or paused, that was the tip-off on leakage. As a double check, a radioactive sodium carbonate solution was injected into the piping. Its progress was also traced with the Geiger counter.

Leak tracing also saved Chevrolet the expense of digging up the 400-ft. line to find the leak.

Round-Headed Rivets Save $10,000 a Year

A tiny change in a riveting gun saved Chance Vought, Inc. (Dallas) $10,000 a year in the assembly of the F8U-1 Crusader. Here's how:

When riveting the skin in the rubber fuel cell area, the rivets were flush on the outer skin but squarish inside. Sharp corners rubbing against the rubber cells tended to wear holes in them. So Chance Vought decided to use a sealant cement to minimize this effect.

Then someone suggested rounded-off heads on the rivets. So a concave head was put in the rivet gun plunger to knock out round-headed rivets for the inside of the plane. Eliminating sealant alone saves 19 pounds of weight per plane. Also saves cost of compound and man-hours required to apply it.

Easy Bookkeeping for Small Plants

A simple way to keep books helps Gangnails, Inc., hold down its burden costs. Principal records are in one convenient binder adaptable to any type of manufacturing company. All cash receipts and disbursements as well as current bank balance are clearly shown on one spread page. Thus the plant manager and other company officials can see the financial picture at a glance.

The bookkeeping system is designed for use by small manufacturers or for intra-plant activities like cafeterias, credit unions, and commissaries. Made by Professional Forms Company (Coral Gables, Fla.) it relieves the owner of bookkeeping detail, keeps all cash records up to date without requiring any more work than writing checks and making bank deposit slips. When checks are written, carbon backing on part of check automatically posts name of receiver, date, and amount on ledger sheet. System also incorporates a simple payroll method that produces an earnings statement for each employee with paychecks.

Source: Rudy Gray, Plant Manager, Gangnails, Inc., Miami.

Floor Strips Keep Reels in Line

Wood strips nailed to the floor reduce materials damage at Rome Cable Corporation (Rome, N.Y.). The strips keep reels aligned, eliminate haphazard storage. This prevents sharp reel edges from damaging wire on other reels.

In all, 2000 square feet of storage area is equipped with these strips. They can be easily moved should storage locations change. For permanent installation, Rome Cable uses metal strips. This simple idea can be used effectively anywhere materials are stored on reels or in rolling containers.

Loader Moves, Not the Boxcar

This loader, not the boxcar, does the moving. That's the big difference in the 16-in. Swiveloader (photo) developed for Honeymead Products Company (Mankato, Minn.).

The unit moves along a 200-ft. dock to load bulk materials into boxcars. Belt speed of 2900 fpm. makes sure material gets to the remotest corners of the 50-ft. cars.

Loader (Stephens-Adamson Manufacturing Company, Aurora, Ill.) is mounted on a special frame that runs between two rails. One rail is on the loading dock; the other is attached to an overhead supporting steel framework. The hand-propelled unit is locked in position during loading operations by a brake. A screw conveyor in the overhead trough brings cargo to loader.

Fixture Shows Way to $15,000 Saving

Some fancy fixturing involving a gallon paint can will save $15,000 in labor and materials for Texas Instruments, Inc. (Dallas). Operation involves filling high-priced airborne radar transformers with roughly a gallon of oil. Sounds like a simple operation, but it's not—because the outside of each transformer must be kept free of oil.

If it isn't, the unit sweats oil when tested at temperatures of 135 C. Sweating indicates the possibility of a leak, makes it necessary to reject and overhaul a high percentage of units. This requires up to 2 man-hours' work, adds to manufacturing cost.

For this reason, Texas Instruments abandoned its former method of filling transformers by submerging them in a vat. The new method takes place in a vacuum. Oil filters into the transformer through a tube welded to the bottom of the can. This screws into the transformer and is fitted with a rubber gasket to insure an airtight connection. Thus no oil can be trapped on the exterior of the transformer to show up as possible leaks during the high-temperature tests.

Talent Search Spots Potential Managers

Don't asume you've spotted every potential manager in your operation. That's the advice of Orr & Sembower, Inc., following a managerial talent search conducted a little over a year ago. All employees were invited to participate. Eighty answered the bulletin board call. Of these, 38 were found to possess greater abilities than their present jobs required.

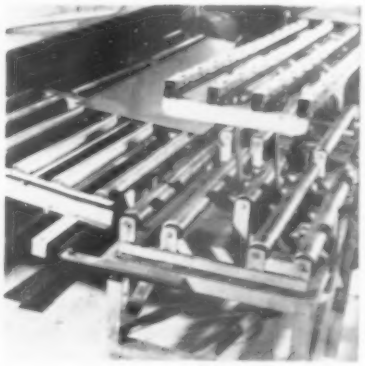
The talent search idea sprang from pressure to meet personnel requirements of an expanding operation. In the year preceding the survey, the company expanded from 306 to 450 employees—a 47% jump. Management wanted vacancies filled from within wherever possible to reduce training costs and keep employee morale at a high level. President Frederick H. Kline feels it's the company's responsibility to make it natural and easy for a talented employee to change jobs and better himself within the company itself.

Applicants took a three-part test administered by an outside consultant in cooperation with the personnel department. A general abilities test battery included measure of memory, mathematical and verbal skills, space perception, reasoning, logic, and mental alertness. Aptitude tests measured clerical and mechanical ability. A personality study measured such traits as sociability and dominance.

As a result of the talent search:

- *Many employees* selected by the survey have been promoted.
- *Other promising employees* are available in the "pool" identified by the search. Some are "immediate promotables." The rest are in a secondary pool requiring development prior to promotion.
- *Every employee* has evidence of management's attitude toward the principle of promotion from within.

Source: Harry S. Wolfe, Personnel Manager, Orr & Sembower, Inc., Reading, Pa.



Automatic Transfer Cuts Cost 75%

Sheet steel moves from shear (left) to press brake (right) at one-quarter the cost of the old way, thanks to a new conveyor transfer. Engineers at Westinghouse Electric Corporation's TV-Radio Division (Metuchen, N. J.) have smoothed out this production kink. They mounted conveyor wheels on a channel-iron frame. An air cyclinder elevates this section from a "down" position between rollers to the "up" position (shown above) while a shear operator paces the cycle.

Here's the step-by-step operation: The first sheared sheet slides by gravity over the rolls to a position over the transfer conveyor. When it hits the stop bars, it also trips a switch. This actuates the air cylinder that raises the transfer and moves the sheet to the press brake

operator by gravity. A mechanical stop holds the second sheet back until the transfer conveyor returns to the down position. As a second check an electrical interlock keeps the transfer conveyor down until the press brake operator uses the first sheet.

Better Way to Clean Heat Exchangers

How would you like to slice $40,000 annually from your equipment maintenance bill? That's what they've done at the Niagara Falls "Elchem" plant of E. I. du Pont de Nemours & Company. How? By using inhibited sulfamic acid for in-place cleaning of heat exchangers—tube bundles, stills, pipe coolers, and the like. Inhibited hydrochloric acid was formerly used for this purpose.

Actually the new method saves money three ways:

1. Cleaning with sulfamic acid halves cleaning man-hours. Usually one man can handle the entire job, which used to take two.

2. In-place cleaning is a lot easier than other methods, including vat cleaning. Especially when the equipment to be cleaned is on an upper floor and has to be removed, lowered to the ground, and then returned to place. For such jobs, in-place cleaning is approximately 90% less costly than the equipment removal method.

3. Du Pont's own maintenance force can do bigger cleaning jobs themselves without the help of outside contractors.

Safety is another reason for using sulfamic acid. Available in granules or crystals from many chemical compounders, there's no leakage or breakage problem in storage. No fumes are given off, even during actual cleaning operations. Workers need no special protective clothing other than goggles and gloves.

A steam jet ejector pumps the inhibited sulfamic acid solution through equipment at Du Pont. The mixture removes rust, water scale, and mud. There's no evidence of corrosion or stress cracking. Another residue removed is an organic tar remaining from the distillation of adiponitrile.

Source: C. T. Gallenger, Senior Engineer, E. I. du Pont de Nemours & Company, Niagara Falls, N.Y.

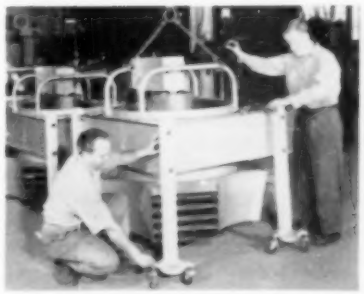
Quality Control by TV

This closed-circuit television system connects engineering (photo) with production departments 4000 feet away at Douglas Aircraft Company's Santa Monica (Calif.) Division. Has proved useful in expediting production, coordinating design and production problems, and saving precious engineering time. Here's how:

Douglas makes over a ¼-million diverse machined parts each month at this plant. Of them, inspection turns up roughly 2% that are questioned for variance specifications. A material review board evaluates each off-standard part. Determines whether the part must be scrapped or can be reworked to bring it within specifications.

In most cases the liaison engineer for the material review group can make an on-the-spot decision. However, where strength of the final structure might be affected, problems must be cleared. This formerly involved trips up to 4000 feet each way to see the engineering stress analysts. Meanwhile special machine set-ups remained idle and tied up production while operators awaited decisions.

Closed-circuit TV system has changed all this. In a 10x10-ft. booth on the machine shop floor, the questionable part is centered under a TV camera. And the magnified image appears on a 21-in. screen in the engineering department three-quarters of a mile away. Forewarned of the problem by phone, the stress engineer is ready with drawings and his calculations at the TV screen. Variations show up so clearly that decisions can be made on the spot. Simultaneous two-way conversations by intercom assure complete understanding. If the part is too large to enter the booth, a blueprint showing the variance is placed in front of the camera. The TV installation has proved so successful Douglas is considering extending it to other locations.



Making Heavy Moves on "Roller Skates"

They're three-wheeled models that make it easy and safe to move revolving air heaters weighing up to 800 pounds. The L. J. Wing Manufacturing Company (Linden, N. J.) uses them to speed units from in-

spection to shipping. The casters slip under the 4-in. wooden posts bolted to the corners of the heaters. Posts protect the metal discharge outlet (beneath) and bring the unit to correct height for assembly of fan and motor frame.

When each unit goes to shipping, a pallet skid is put underneath to replace the casters. Then a crate is built around each unit. Formerly hand trucks or hoists were used to move the heaters.

Hoppers Halve Cost of Handling Scrap

Handling scrap can be a headache for tile producers. But not for Architectural Tile Company (Keyport, N. J.). It has been able to reduce by 50% the man-hours required to dispose of roughly 15,000 pounds of scrap tile and waste every day. Takes a minimum of time and effort. And there's no interference with production schedules.

Architectural Tile's system is built around the effective placement and use of 12 self-dumping hoppers (Roura Iron Works, Detroit). Most are located as close as possible to scrap-producing operations in order to eliminate intermediate collection movements. When hoppers are full, a fork or powered hand truck moves them outside and empties the scrap into a dump truck.

Two of the hoppers have a special assignment. They're used to service the dust collection system in the dry-mix department and press room. Funnel-shaped bins store this dust outside of the building. Periodically the hoppers are used to transfer the dust back to the dry-mix machine. Since reclaimed dust must not be contaminated, the hoppers used for this purpose cannot be used elsewhere in the plant.

School for Families Going Abroad

School's in session at Champion Paper & Fibre Company's Canton (N. C.) mill. Pupils are a picked group of skilled employees not only from Canton, but also from the company's plants in Hamilton (Ohio) and Pasadena (Texas). Wives and children are included in the training.

The families are scheduled to depart for Brazil this fall. So they are studying basic Portuguese, Brazilian history and geography, Brazil's traditional relationships with the United States, and its laws, customs, and social patterns.

The wives also learn about the typical Brazilian diet and how to buy and prepare local foods.

The men will staff a new pulp-making facility Champion is erecting, managing, and helping to finance at Mogi Gaussu, some 80 miles inland from Sao Paulo. When it goes into operation early next year, it will be Brazil's first fully integrated bleached kraft pulping plant. The Americans will remain in the country from 12 to 18 months, or until the Brazilians can take over the technical operations. New York University's Services to Business and Industry section is administering the educational project.

Chutes Shave Cycle

Twin chutes like this one (photo) helped The Tasty Baking Company (Philadelphia) reduce its baking-to-shipping cycle from a maximum of 12 hours to a minimum of 45 minutes. Company engineers designed the inexpensive sheet-metal chutes. Now cartons from the upper floors of the plant shoot the chutes to shipping in jig time, are discharged onto a roller conveyor, then moved to storage areas for final sorting and loading in delivery trucks.

Old way: Workers moved baked products by hand truck, caused a big jam in shipping at day's end. Then trucks had to be returned to individual departments later. This also took plenty of time.

No-Nick Carriers

It's a tough problem to handle low-torque, minimum-backlash gears without damaging them. That's why Ansco's Camera Plant uses specially designed wire baskets. They cost about $12 each, but Ansco has found they are well worth it.

Major advantage of baskets is to protect gears from a nicked tooth or dirt smear that could result in a teardown. But they have many other benefits, too, including the following big ones:

- Baskets can be stacked in storage or near work areas without damaging gears.
- Rods can be positioned for easy grasp of blanks and an easy aside for finished gears.
- Gears can be cleaned in vapor or cold degreasers in same baskets.

Flexibility was built into these wire basket carriers so that they could be used for gears of various sizes. In the above photo only two cross rods are being used to hold gears. However, there are five additional rods that could be used if smaller gears were being handled. Also position slots at both ends of the basket make sure gears stay in place, don't nick each other.

Source: Warren Hauck, Camera Plant Manager, Ansco Division of General Aniline & Film Corporation, Binghamton, N. Y.

1. SCRATCHES ARE OUTLAWED . . .

2. PIPE-END BURRS MUZZLED . . .

3. USABLE PARTS RESCUED FROM SCRAP . . .

4. FITTINGS DEGREASED TO SAVE $17,000.

Small Changes Add Up to Big Savings

Prevention and reclamation are key words at Rocketdyne Division of North American Aviation, Inc. (Canoga Park, Calif.). Tiny flaws in materials can have big effects on the Atlas, Thor, Jupiter, and Redstone motors Rocketdyne is making.

Preventive measures—like those in the top two photos—are promoted by classes, publicity, and training. A "grass roots" committee buttonholes new and old employees in each department to stress the prevention message. Also these committees meet regularly with workers to discuss new measures.

Reclamation efforts concentrate on screening and salvaging (bottom photos) every piece of scrap before it goes to the junk heap. Anything usable goes back into stock. Worn parts still in useful condition go to salvage. Only parts that are total scrap go to the dump. To illustrate results of Rocketdyne's program, here's a quick rundown on four changes that are saving plenty in time and money:

1. Scratch stopper—The addition of rubber matting on stock shelves is a simple, practical way to cushion parts and keep them from getting scratched. Even small exterior scratches can weaken aluminum, could cause parts to rupture under high pressure during rocket flight. That's why pains are taken to keep surfaces smooth.

2. Pipe protector—Plastic caps are saving hundreds of feet of aluminum piping each year by taking the sting out of burrs that result when pipe lengths are sawed from longer pieces. If left on the tubing, they will scratch other tubing that's stored with it. Rocketdyne has no idea of the resulting dollar savings. But it's sure the practice is saving hundreds of feet of tubing from the scrap heap.

3. Parts saver — Conservation practices of Rocketdyne's tubing section show little things mean a lot. In the above picture a worker cuts up a discarded line to save the B-nut and sleeve. These will be used later on mock-ups. Same goes for piping sections that might—without close scrutiny—end up on the scrap pile.

4. Parts degreaser—Fittings from Rocketdyne's scrap lines get a thorough degreasing and cleaning with heated, pressurized cleaning fluid. Both aluminum and stainless steel B-nuts and sleeves are salvaged in the tubing department. Operation racks up a total annual folding-money saving of $17,000.

YOU BE THE ARBITRATOR

THE CASE OF

The Arrant Applicant

Out of the experience of the American Arbitration Association

When management examined bids for a skilled job, it discovered only two applicants had the necessary technical qualifications. Of the two, the senior man had disciplinary problems. He been reprimanded twice in the previous year, and given two penalty layoffs for violation of company rules. Thus the junior man, with a spotless record, got the job despite the contract clause that said promotion was to go to the senior bidder, assuming equal ability, merit, and capacity.

The union filed a grievance. "You've already disciplined this man for each violation of rules," the shop steward argued. "You can't deprive him of his rights or privileges again for the same offenses. That's double jeopardy."

"Just a minute," replied the personnel director. "This job calls for reliability as well as technical ability. The senior man is not dependable enough, so we were justified in bypassing him. We consider a man's disciplinary record a measure of his merit."

Eventually the case went to arbitration. Suppose *you* were the arbitrator. How would you rule?

For the actual decision turn to page 112

How to Turn Down That Mental Heat

The heat waves are coming soon! And a good point to remember: Not all the discomfort of high temperature is in the mind—*but some of it is*. If you know the details of heat psychology, you'll be able to make your workers more comfortable when the dog days arrive. To give you some idea, here are the essentials of good heat strategy as presented by Kaiser Aluminum & Chemical Corporation (Oakland, Calif.) in a supervisor's booklet. When the mercury soars, your men will probably...

- *Get ornery* because the heat irritates them.
- *Have lower morale* and not cooperate as well.
- *Feel more tired* than usual.
- *Worry more*, brood sometimes.
- *Squawk more*.
- *Not concentrate* as well.

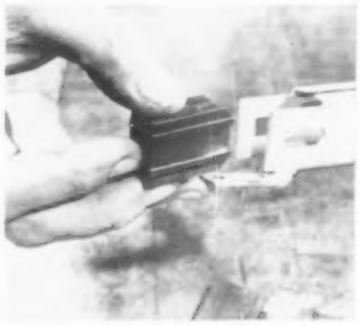
All these emotional strains in turn increase body temperature and body discomfort. Contribute to attitudes of resentment and antagonism. This tends to lower a man's resistance to "feeling hot." So the hotter he gets, the hotter he feels, and the madder he gets.

What do you as a manager do? Here are a list of *Do's* and *Don't's* Kaiser lists for its supervisors:

- *Don't* start any intensive training program.
- *Don't* introduce new procedures, materials, or tools.
- *Don't* kick off a fund-raising campaign or blood drive (or any other "extra") in hot weather.
- *Do* schedule tough jobs early in the day (before the sun is high).
- *Do* settle minor grievances right away, without letting them grow.
- *Do* expect a drop in efficiency.

Here are some specific gimmicks you can use, even if you can't lower the temperature. They *show* you're doing what you can, thus contributing to the comfort of the employee, both mentally and physically.

- *Tie short pieces of ribbon* to the front grill of the air outlets and fans to draw attention to air circulation.
- *Use man-blowers* on the floor. They will promote cooling by evaporation of sweat, even if they do boost temperature by drawing and blowing hot air from upper levels. Circulation of air itself is comfort enough for your men.
- *Spray water*. If a spray is visible, it can improve employee attitude even if the temperature isn't changed by the spray.
- *Let the fans whirr away*. The mere sound makes people feel comfortable. Changing speed or sound of air circulation system also helps reduce discomfort.



Nylon for Metal Chops Cost 20%

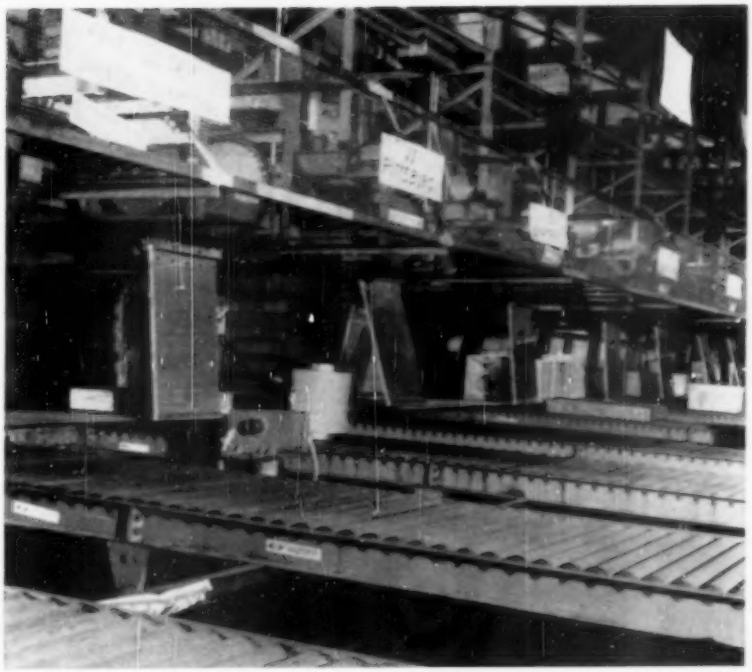
A new oven-door lockstop saves up to 20% in materials costs (plus assembly labor) at Westinghouse Electric's Major Appliance Division (Mansfield, Ohio). Key was replacement of a metal assembly with a slide molded of filled nylon.

The lockstop must resist heat and abrasion, be rigid and dimensionally stable. For the job, Westinghouse picked a molybdenum-disulfide filled nylon called Nylatron GS (National Polymer Products, Inc., Reading, Pa.). It doesn't distort until it hits 400 F., and then only under the drag of a 13-lb load.

Bigger and Better Medical Insurance

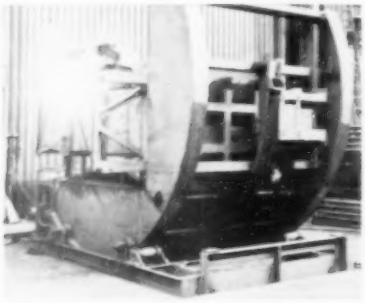
That describes the new plan at Pitney-Bowes, Inc. (Stamford, Conn.). And rate increases are low compared with added benefits. Here are some out-of-the-ordinary provisions of the plan:

- After an employee pays the initial $25 of any hospital and surgical bill, the plan pays the next $475 in full, plus 85% of additional costs up to $10,000.
- After an initial $50, paid by the employee, the plan covers 75% of other expenses up to $10,000. Treatments for nervous, mental, and allergic conditions are included.
- Benefits for children can continue until they are 23, instead of stopping at the usual 19 years of age. But there's an additional charge of $4.05 per month involved.
- Post-retirement benefits are increased to $1500 for hospital and surgical expenses plus $1500 for other expenses. These are at the low rate of $1.25 per month for the retiree, or $2.50 per month for retiree and dependants.



AUTOMATIC SORTER GIVES PARCELS RUSH TREATMENT

An electronically controlled handling system solves the costliest, most time-consuming problem in mail handling—sorting of large parcel post packages—at Pennsylvania Railroad's Philadelphia terminal. Could do a similar job in many warehousing operations. Saves money by reducing manual handling, visual sorting. Moves mail through terminal 8 to 12 hours faster. The sorter (Stewart-Warner Corporation, Chicago) codes raw "mail" by destination as it moves along a 220-ft. conveyor belt. Then a transfer paddle actuated by an electronic memory system sweeps the package from the main conveyor to the proper distribution conveyor at just the right time.



Moves Big Parts With No Trouble

Moving transformer tanks weighing up to 12,000 pounds during assembly is a lot easier with motor-driven positioners now in use at G-E's Medium Transformer Department. The positioners have:

- *Decreased* overhead crane moves 75% in this area.
- *Cut* over-all assembly cycle time.
- *Eliminated* vertical and overhead welding, thus lowered training and job classification requirements for welders.
- *Improved* weld quality since all work is now done in the horizontal position.
- *Made it possible* to do the major portion of the welding operation at one location.

Each L-shaped positioner is a self-contained unit capable of safely placing a tank in any position. The frame itself, powered by a 3-hp. motor, rotates through a 90-deg. arc to lay tanks on their sides. In addition, there's a turntable on the short leg of each frame that travels in and out to facilitate positioning of large tanks. Turntable is rotated manually, then locked in place. However, a ¾-hp. motor moves it in and out.

Over each positioner is a 3-ton jib crane, used mainly for hoisting component parts to be assembled.

Source: L. H. Clark, Manager, Manufacturing Engineering & Facilities, Medium Transformer Department, General Electric Company, Rome, Ga.

Lending Teachers to High Schools

That's Max Bart in the photo. He's an analytical chemist and research engineer for Hughes Aircraft Company (El Segundo, Calif.). He's giving a classroom demonstration at the Bronx High School of Science (New York City) on some problems related to synthetic resins and plastic materials. Bart's lecture is part of a "pilot" project that brings working

scientists into the classroom to help advance scientific knowledge in secondary schools. The program, begun in 1955 on the West Coast by the Hughes Company, has the approval of the New York City Board of Education and the Institute of Radio Engineers. The project is expected to be enlarged next year with the help of scientists from many other industrial firms.

STERILE ROOM ROLLS RIGHT TO THE JOB

This is the hospital-like interior of a 35-ft.-long contamination-free cleaning room on wheels. Designed by Wyle Laboratories, an El Segundo (Calif.) testing company, it meets the needs of many missile components manufacturers in the area whose products must be virtually 100% free of hydrocarbon contamination. Semi-trailer features a filtered air system, airlock entryway, cleaning dip baths, vapor degreaser, drying oven, "black light" inspection unit. Personnel in trailer wear nylon smocks, caps, and shoe covers. In addition, actual testing can be conducted in the trailer.

Ten Ways to Boost Retiree Morale

The 70 retired employees of F. E. Myers & Brothers Company don't lose their friendships and the feeling of belonging that they gained over the years. And for good reason, too. The company's plan for continuing service to the retiree is something special. It includes the following ten points that are over and above the usual company pension and life insurance programs:

• *Group hospitalization.* It's one of the first plans of its kind. Employees joining within 30 days after retirement have no waiting period before coverage. Program is with Woodman Accident Company (Lincoln, Neb.). The retiree pays total cost of the insurance; the company absorbs the administrative costs. No physical examination is required. Benefits can be extended to the retiree's spouse. Surviving spouse can continue to carry insurance. Rates based on sex and age range from $4.10 monthly to $7.85.

• *Monthly news letter.* Prepared and edited by the Director of Employee Benefits for retirees only. Contains news about retired employees, information on company activities and plans, announcements of coming social events, general news of interest to retirees. In addition, various company officers send out periodic letters to retirees informing them of the progress of their company.

• *Counseling service.* The employee benefits office is open at all times to retired employees. Here they can obtain information on social security, pension payments, or any other problems related—or even unrelated—to retirement.

• *Plant visits.* Many retirees return to visit with their former fellow-employees. The company encourages this, feels it's a strong factor in eliminating the "left out" feeling among retirees.

• *Participation* in Recreation Association activities. Retirees receive life memberships. They and their families are welcome to attend the annual Christmas party and company picnic, go on fishing trips sponsored by the organization, participate in other activities. This employee group sponsors at least one event monthly.

• *Membership in Retiree Club.* This organization was established about two years ago, solely for retired employees. Highlight of the club's activities is an annual dinner with company officers.

• *Visiting the Service Club.* This facility was completed in the summer of 1956. It's a 4000-sq. ft. former manufacturing area that has been completely remodeled. Daytime attendance at the clubroom is about 200 a month.

• *Membership in 25-Year Club.* Retired employees associated with the company for 25 or more consecutive years retain their membership in this organization. It holds two functions each year—a dinner in January, featuring a well-known speaker, and a picnic in the summer.

• *Membership in Credit Union.* Retired employees can continue to save money with or borrow from the company Credit Union.

• *Remembrance.* All retirees receive a gift at Christmas. The Director of Employee Benefits also visits bedridden or hospitalized retirees and often takes along fruit or some other useful gift.

Do Myers retirees appreciate these many efforts? One retiree feels this way, "I used to think of retirement as being 'put out to pasture.' But that's far from the truth. I still feel I am a definite part of the Myers Company, and I have more time to enjoy it."

Source: G. H. Weiss, Director of Employee Benefits, F. E. Myers & Brothers Company, Ashland, Ohio.

Reprints of the Plant Operating Case Book are available. Price 50¢. For quantity prices write Reader Service Department, FACTORY, 330 W. 42nd St., New York 36.

CINCH TO MAKE A CHANGE ON THIS LAYOUT BOARD

Ease of workability is big advantage of 11x16-ft. layout board at Chrysler Corporation's (Twinsburg) Ohio Stamping Plant. Aluminum grid plates can be removed one at a time, worked on, then replaced. This makes it easy to move templates or duplicate any section. Plates have ¼-in. grid lines etched on them. Board gives complete picture of plant, aids in movement and placing of equipment. It's also useful in planning flow and storage of materials. Total cost of board, including grid plates, template material, and tapes, was about $980.

Sure Way to Lower Inventory Costs

Centralized inventory control using statistical methods is really paying off in Westinghouse Electric Corporation's Manufacturing & Repair Division. May be something to consider when you're looking for ways to reduce inventory costs. Especially if your organization happens to be spread all over the map like this one.

Essentially the plan establishes ground rules for a unified approach to inventory control. Weaves all departments creating or controlling inventory into a single unit. This permits centralized operating personnel to manage and control inventory decisions in a business-like manner on a cost basis.

This may sound like a big order. And it is when you consider the size of the M & R Division. A total of 41 plants are involved. Sixteen of them perform both manufacturing and repair work; the other 25 deal solely with repairs. The smallest plant employs 15 people; the largest 2500. The division stocks 80,000 different items; individual plants handle from 500 to 10,000 items. Supply sources are other Westinghouse divisions or outside vendors with delivery time varying from 2 weeks to 6 months.

All M & R Division installations won't be covered by the centralized control system until later this year. But it's already evident that the payoff will be substantial. For example, in a pilot plant installation, inventory was cut 30% in a period where gross sales increased 10%. Over-all the division expects to obtain these benefits by:

- *Providing* more efficient inventory control based on costs.
- *Centralizing* stocks to eliminate pyramiding of like items in decentralized locations.
- *Getting* lower material costs by quantity buying from outside suppliers.
- *Improving* methods for disposal of inactive and surplus stocks.

Individual plants will benefit, too, through:

- *Reduction* in turnover rate by as much as 15 to 30 days' supply.
- *A 30% drop* in the number of restocking orders placed.
- *A 25% decrease* in clerical time as a result of controlling stock on a probability basis.
- *Savings* of approximately $150,000 annually as a result of centralized buying.

In the centralized control program, all inventory calculations are made at a central point in Pittsburgh. Then information is sent from there to plants at regular intervals. To perform the inventory control calculations quickly, Westinghouse programs them on an IBM 607 computer. This machine can turn out 1200 accounts per hour.

At present, inventory control information on such factors as ordering quantities and re-ordering points for approximately 25,000 finished stock parts is processed weekly on a statistical basis. In all, the computer makes 17 pertinent inventory decisions for each account. This information is printed on a report and forwarded to the decentralized plants. Aside from providing information pertinent to re-ordering, plant locations have only to advise central control of changes affecting fixed information that should be considered in the development of weekly calculations.

Source: Earl D. Garver, Manufacturing & Repair Division, Westinghouse Electric Corporation, Pittsburgh, Pa.

It's a Pipe to Lift With Magnets

Pipes move in a hurry when heavy magnets latch onto them at Southern California Gas Company (Los Angeles). The two magnets are mounted on an 11-ton fork lift truck. Can handle bare and coated pipes with diameters from 2 to 30 inches and up to 60 feet long.

Key to efficiency is pivoting mo-

tion of magnets. For heavy pipes they stay parallel to piping, contacting a maximum amount of metal. For light pipes, magnets are turned at right angles, can pick up more than one length at the same time.

Magnets (F. W. Shrader Company, Los Angeles) are wound with aluminum conductor, weigh a ton each. D-C power for the magnets comes from a standard welding generator. A multi-step switch permits energizing of magnets to 25, 50, 75, or 100% of full power.

Electronic Truck Speeds Maintenance

Taking a tip from other maintenance crews, the electronic maintenance section at Western Electric Company has mounted its equipment on a truck. A single hand vehicle carries all the instrumentation needed for many electronic repair jobs.

The easily constructed angle-iron framework has a place for everything an electronic maintenance man needs on the job. On top is a center-hinged removable Lucite cover. The shelves hold a two-channel magnetic oscillograph with a d-c amplifier, a vacuum tube tester, capacitor checker, and a 5-in. oscillograph with isolation transformer. All these instruments are standard and commercially available.

Lower part of the truck has drawers and shelves for tools, blueprints, repair manuals, repair records, test leads, adapters, and additional instruments needed for specialized jobs. A central 115-volt, 8-place receptacle supplies power to all of the instruments. Each of these receptacles is separately fused for additional protection. In addition, each instrument is protected by a self-contained fuse.

Source: W. L. Flynn, Engineer, Western Electric Co., Indianapolis.

Students Elect, Company Pays

Evening college courses conducted in the plant, with all tuition, books, and materials paid for by the company, are not uncommon practice. Especially if the courses relate to everyday work. But that's not a requirement at Continental Materials Corporation and Helene Curtis Industries, Inc. (Chicago). Courses, conducted at these two companies through Chicago's Roosevelt University, have *no* relation to the job. Programs strive for a complete college credit curriculum.

The companies reason that employees who further their own education, no matter what the subject, are more likely to be "on the ball" in their work. They have wider perspective. Are more aware of their potential abilities and advancement. On-the-job training just doesn't give the employee the same satisfaction as an independent college course.

In addition to in-plant training, both companies have a long-standing program of paying full tuition for any employee taking any accredited course at colleges in the area. They believe the programs have reduced turnover, absenteeism, inefficiency, and poor workmanship.

Chicken Feed Gets Just-Right Mixing

Vibratory feeders have changed a whole production system at Red Comb Pioneer Mills (Wilmington, Del.). Grains for chicken feed have to be mixed with care to get the correct proportions of a number of ingredients. Vibrators do the job automatically. Pull exactly the specified amount of each grain and compound out of large storage bins and blend them. Before Red Comb installed the vibrators, all materials for the various feeds were received in 100-lb. sacks which had to be opened and pre-mixed for each type of feed. This took time, cost plenty.

Vibratory feeders (Eriez Manufacturing Company, Erie, Pa.) accurately feed ingredients into a continuous line-mixing operation at rates from 1 to 50 pounds per minute, depending on the formula requirements. The electro-permanent magnetic units run on available a-c current, so no rectifiers are needed.

Two Booklets Have All the Answers

Someone's missing from the photo. It's the industrial engineer who wasn't called to answer this employee's question about an incentive rate. Supervisor and employee can solve the problem themselves—with the help of two booklets and six manuals. Publisher is the industrial engineering department at Pennsylvania Transformer Division of McGraw-Edison Company.

Other benefits of this program (besides freeing IE's from the question-answering chore):

- *Fewer grievances* over incentives and wage rates. And, when a grievance is filed, it's specific. Thus time is saved in negotiation because the basic contention is clear.
- *Time study engineers* take added pains to be more consistent; develop more uniform standard data.
- *Orientation time* for new employees is decreased.
- *Improved reaction* by employees and management to methods improvements and special cost reduction effort.

Two booklets—one on time study, the other on job evaluation—were developed in conjunction with the

advertising department. All 1600 employees received copies. New employees get one when they start work. Both booklets are short, easy to read, use eye-catching illustrations. The first cost 17¢; the second, 40¢ a copy.

The manuals are distributed only to management people, including foremen and assistant foremen. But, their content is no secret, any employee can refer to them at any time. Manuals cover wage incentive policy, time study, methods, department organization, job evaluation and procedures. Range in length from 9 to 43 pages. After supervisors complete training in each of these subjects, they receive their manuals. Union officials are also invited to participate in this training.

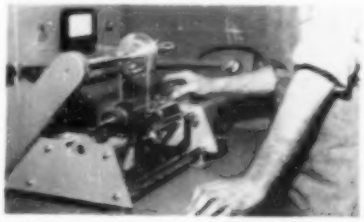
Source: H. T. Zimmer, Manager, Manufacturing and Industrial Engineering Department, Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pa.

Cracker Trainer

Duplicate of a real panelboard at the Toledo plant of Standard Oil Company of Ohio is being used to train both supervisors and workers to operate the company's new fluid catalytic cracker. The new training board (built by Carmody Corporation, Buffalo) can simulate all operations of the cracking process.

Zipper Jacket for Missile Cable

They expect to cut labor costs about 50% on jacketing wire at Northrop Aircraft, Inc. (Hawthorne, Calif.)—thanks to a new zipper-type cable jacket (Zippertubing Company, Los Angeles). The new missile cable jacket can be placed around the cable bundle by one man and zipped closed in a few seconds. For experimental work, cable can be unzipped to make changes. When ready for final assembly into missiles or planes, a plastic solvent is brushed along zipper line to close the tubing permanently. Previously, wiring had to be pulled through tubing by hand—a time-consuming, two-man job.



Central Depot Cuts Tool Repairs 45%

Centralization is the answer to hand tool breakdown at Grumman Aircraft Engineering Corporation (Bethpage, N. Y.). Here one center repairs and tests hand tools. Set-up has already paid off in longer tool life, fewer breakdowns. Grumman estimates a repair reduction of 45% with dollar savings of about 20%; gives three reasons for savings:

- *Foremen sign an order* to have tools taken for repair. As a result, they know more about the condition of tools.
- *Operators take better care* of their tools. Since a man doesn't get the same tool back, he tends to hang on to a pet tool.
- *Major repairs are not* as frequent as they used to be.

Grumman used to repair hand tools in each major area, but had no adequate test facilities. Now a scooter picks up drills, rivet guns, and other power tools from cribs spotted in the plant. Whisks them to the central station where they are indexed, repaired, and tested—electrical tools for free speed, torque, power consumption, and general conditions; pneumatic tools for air consumption, blows per minute, compression, and torque.

One example of the care Grumman takes with each tool repair is shown in the photo. Dynamic balancing cuts down on uneven wear of bearings and tool parts, assures minimum of vibration, restores tool motor to top condition.

CASE BOOK CAPSULES

Largest aluminum heat-treat furnace in the aircraft industry is operating at Convair, San Diego. Built by Despatch Oven Company (Minneapolis). It cost $255,000. It's about 41 feet long, has an 8-ft. cross section.

Rugged transistors of germanium and silicon for control equipment can be fired from a shotgun. General Electric Company (Schenectady) mounts their tiny semi-conductor bars on a flat ceramic base.

Computer processing pictures, using general-purpose digital units, is under study by the National Bureau of Standards. Calls for conversion of pictorial matter to digital form so it can be processed and displayed visually.

"Hush-houses" reduce the roar of powerful jet engines to a whisper at Edwards Air Force Base. Over 2700 Soundstream units and 680 acoustical panels (Koppers Company, Inc., Baltimore) are used to do the job in four buildings.

Added benefit for extra paid holiday (July 7) lets employees at Evinrude Motors (Milwaukee) borrow one of the company's products—an outboard motor. Thus they can go cruising, fishing, water skiing over the 4-day week-end.

Dissolved oxygen analyzer of Beckman Process Instruments Division (Fullerton, Calif) automatically measures content in high-purity water. By monitoring oxygen-removal efficiency, helps minimize corrosion in steam units.

Boilers generating steam efficiently by burning a new, low-volatile "char" have been announced by Babcock & Wilcox Company (New York City). Promises to reduce fuel costs for power production.

Automatic translation of scientific Russian to English is the function of a machine under development by the Air Force. Has a Russian-English "dictionary" of some 160,000 Russian entries.

Special Sluiceways Take Heavy Abrasion

Six years of trouble-free service. That's the story of sluiceways at Ford Motor Company's Rouge Plant (Detroit). They carry cupola slag and dust away from the foundry. Maintenance so far has been confined to a few points that take a beating from initial water jet blasts.

Waste discharges at a constant driving pressure of 60 psi., 16 hours a day, 5 days a week. Water jets spaced at 10-ft. intervals impel sludge along sluiceways.

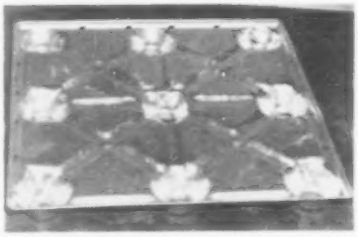
Sluiceway surfaces were made by raking and grooving structural base concrete, then adding Emeri-Crete (Walter Maguire Company, Inc., New York) to a depth of 1½ inches. Emeri-Crete is a low-water-ratio mix of Cortland emery aggregate and Portland cement.

No Dip, No Drip With These Rollers

Easiest way to move paint is through a hose under pressure. Best way to apply the paint is by roller. Combine the two and you know how this 85-ft.-high masonry block wall was painted in jig time.

That's the system used at the Cleveland Ordnance Plant operated by Cadillac Division of General Motors Corporation. The paint was fed via ½-in. hoses from 30- and 60-gal. pressurized, agitating tanks directly to the paint rollers. A thumb-actuated valve in the roller handle releases paint to the rollers (E-Z Painter Corporation, Milwaukee) as it's needed.

Contributions from readers reporting experiences will be welcomed. No need for fancy writing; just a clear concise statement of facts. If you have photos or drawings, be sure to include. We'll edit for the Case Book. Contributions accepted will be paid for at time of publication. Address: Case Book Editor, FACTORY, 330 West 42nd St., New York 36.



Latest in Pallets That Nest

Got pallet storage problems? Then take a look at the U. S. Navy's new steel pallets. They take up less than a tenth as much storage space per pallet as conventional wooden pallets. Reason: They nest just like metal cafeteria trays. Thus 75 metal units occupy the same cube as 7 wooden pallets.

New pallets (Ackerman Manufacturing Company, Wheeling, W. Va.) are stamped from sheet metal, galvanized to prevent rusting. Cups in base support pallet, yet allow forks to get underneath for lifting. Pallets are 43 inches square. Cost about $10 each. Weigh 44 pounds in 14-gage sheet.

PINT-SIZE PRINTS

Half-size blueprints (left in photo) are a boon to Boeing Aircraft Company (Seattle). They saved Boeing $206,000 in blueprinting costs last year. Besides saving material, the prints fit into one-quarter the space in filing cabinets or drawers. Other pluses: Small prints can be laid out on an airplane wing or in small spaces more easily than full-size prints.

YOU BE THE ARBITRATOR

Continued from page 106

The award—The arbitrator said the company had not violated the contract. But he added this decision should not bar the employee from future promotion if he mends his ways and shows more responsibility. The arbitrator felt a record of discipline could not be the *only* test of a man's fitness for promotion, but could be one of the criteria. He came to this conclusion because of the use of the word "merit" in the promotion clause.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony, and other facts involved.

Drawers for Gaskets

Gaskets of every size and shape were causing a big headache at the San Francisco Naval Shipyard. There was no ready cross-reference system, no easy way to find the right gasket in a hurry.

That's changed now. Special chart drawers store gaskets. And screws inserted through the bottom of the drawer hold them in place. For easy identification each gasket gets a stock number, while a label on the outside of each drawer indicates both stock number and alternate numbers of all gaskets inside. Gaskets are also listed on separate index cards arranged alphabetically and numerically by manufacturer.

Even though there's a constant change in the stock, the new system is flexible enough to keep track of every gasket—from the one for the power lawn mower to the one for the shipyard locomotive.

"You can make swift, decisive moves right now," says Cost-Cutter Schleusener

18 Ways to Pinch Pennies

With sales in a dip, the pressure is on to cut costs hard, wherever you find 'em. This shrewd cost-cutter tells you where to look, what to do, for fast results.

CAN YOU CUT production and costs to match today's sag in sales? And do it quickly? Without taking time (which you don't have right now) to set up a full cost reduction program? Without jeopardizing your company's ability to meet the sales upswing when it comes?

Answer is "Yes." You can make 18 swift, decisive moves now (see below). They won't add up to the kind of formal, far-reaching cost reduction program I have preached and practiced (FACTORY, February-December 1956). But when you have to make quick cuts there just isn't time to install such a program. Time to set that up was when you were riding high, wide, and handsome on big sales. Today, with sales down and no quick pick-up in sight, you've got to move fast. If you don't, you'll sink even deeper.

But before you plunge headlong into cutbacks, take at least a little time to think about what you're going to do—and not do. In short, set up your approach four ways, then go after production and costs.

By ERNEST SCHLEUSENER
Cost Reduction Specialist
Athol, Mass.

Here are suggestions:

. . . *Organize your attack.* That doesn't mean set up a department or write procedures. But the simple order, "Cut costs such-and-such a per cent," is the disorganized approach. It does more harm than good, eliminates necessary expenses along with unnecessary expenses.

. . . *Settle on how big the total cut must be.* How much lower are sales? What's the short-term outlook for sales? Any prospects for an up-turn in your industry? You won't get finite answers to all these questions. But to set your sights you'll need the best answers you can get.

. . . *Get everybody into the act.* The need to cut costs is clear to you. But it won't be clear to everybody. Cost cutting of any kind can't be a one-man show—or even a management-only show.

. . . *Look for the best sources of quickest cuts, go after them first.* May be direct labor, indirect labor, or inventories. Whatever it is, put the pressure on. But don't overlook any source that promises immediate cost reduction.

Now, with your approach settled on, you're ready to take a crack at the 18 cost targets that follow.

1. PRODUCTION AND SALES

You need balance here. In some plants output has exceeded sales and shipments. If this is true at your plant, take a sharper look at new forecasts as well as historical statistics. These lean times may reveal a change in product mix that wasn't obvious earlier. And different products usually have entirely different cost characteristics.

Often there's a failure to match production cutbacks with corresponding cuts in man-hours. Sure, you can't always match them evenly. But the trouble is, sales dollars fall back in direct proportion to sales volume. And if you can't cut costs back pretty close to the reduction in volume, your profits will suffer. So take a close look at your company's break-even chart.

2. NEEDS AND OPTIONS

One way to look at every expense is to ask, "Is this necessary?" For a while, at least, especially when sales are down, you can eliminate some expenses this way.

For example, overtime. This should be one of the first to go—

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"Today, with sales down and no quick pick-up in

look for chances to shift bottleneck workloads to other machines or shifts.

Service departments are necessary —but only as long as they keep direct employees productive, maintain quality, and control costs. Eliminate any work they do that doesn't meet these objectives.

Still critically necessary: painstaking care with the troublesome jobs—those that require special attention to satisfy the customer.

In these times you can't afford beauty for beauty's sake. Some landscaping, remodeling, and painting will have to wait for better days. Even so, there are times when this kind of work is justified to keep some necessary hands busy. Whatever the reason for doing it, make it clear to your employees. Otherwise they'll be critical of what looks like unnecessary work.

3. PRODUCTIVITY

When costs threaten to devour profits—and even more—output per man-hour, in the office as well as the shop, is more important than ever. If you don't have them already, you'll need daily reports of productivity. More important than reports is the sustained pressure to get performance moving in the right direction—and keep it there. If you're dealing with measured work you can set performance goals. But it's not easy. In times like these there's an understandable tendency to slow down a bit, make the available work last a little longer.

Now's the moment also to cut down on wasted time. Here are a few basic steps to take:

. . . *Get everybody starting to work on time.* Show your people the need for working right up to rest breaks, lunch, quitting time. Often this amounts to 15 minutes a day.

. . . *Cut the so-called "enforced" idle time*—waiting for materials, repairs, instructions, etc. The list is long. And time is costly. A daily report of idle time is helpful. But it must be accurate—no "fudging."

. . . *See that every employee has a fulltime job.* For direct labor it's just a matter of providing full production schedules. Indirect labor (including maintenance) is tougher. But a little study of indirect ratios and work assignments will pay off handsomely.

4. RETRAINING

Sure, it costs money to train. But the money you spend for training may bring savings. Training is a luxury only when it doesn't help you meet short-range needs for productivity, quality, and low cost. In particular, take a look at retraining people for jobs newly created by seniority "bumping." Often job shifting at the time of cut-backs causes productivity losses that you can pick up with retraining.

5. CAPITAL EQUIPMENT

Your capital-equipment budget probably will be cut. But there's more to meeting this cut than just lopping off the marginal items—the things you'd like to have but don't really need. So you'll want to give a careful review to your whole list of planned capital expenditures—right away. Your restudy should answer the following questions:

. . . *How does lower volume* affect the necessity of the new equipment?

. . . *How does lower volume* affect the economic justification?

. . . *Will the new equipment* bring lower costs, better quality, or other advantages that will spur sales?

. . . *Can acquisition* be postponed?

. . . *Can the need* for the new equipment be satisfied another way? By subcontracting, or by changing your product design or processing methods, for example?

. . . *Can the equipment* be acquired by rental or lease-purchase?

6. CASH IN HAND

Now's the time to conserve it. Many a man in operating management feels the company's cash position is a problem for the accounting department. Granted, calculation and analysis of cash flow is a financial matter. But operations affect cash. So operating management must accept its share of the task of conserving cash. There are several ways, as follows:

. . . *Keep inventories down* — all kinds of inventories.

. . . *Complete and ship orders quickly*, thus acquire cash. Hold delinquent orders to a minimum.

. . . *Consider getting the equipment* you need on a lease plan or a revolving bank loan plan.

. . . *Trim the costs* of necessary maintenance and improvement projects down to the essential elements of no more than economical quality.

7. INCOMING MATERIALS

Review all purchase orders and requisitions. Find out whether material is needed for customers' orders now on the books, or for future orders. If it's for orders in hand, let it come into the plant—but not before it's needed. Work closely with your suppliers to keep inventory down. Some suppliers will complete an order and hold it for you, shipping and billing only as you need the material. Others will let you have material on consignment.

Keep material for future orders out of your inventory. Postpone or stretch out deliveries, cancel those that will swell your stock. Deliveries and lead times are shorter these days, so you may not need much reserve stock.

Don't count on seasonal upsurges. They may not be big this year—may not happen at all, in fact. But if you do reduce inventory to a lower level than usual, keep your supplier informed. He may want to do some stocking for you.

8. SUPPLIES

Cut your supply costs in proportion to your sales volume—if your sales volume is slipping. While you're checking production orders, check your orders for tools, dies, fixtures. You may be able to eliminate some, postpone others.

Take a look at your procedures for approving supply requisitions. Get responsible names on the requisitions. Look at the records for supply costs—and give credit to those who improve usage.

sight, you've got to move fast against costs"

Don't stock supplies you can get from local suppliers. Look into the possibility of common stocks with other local plants or suppliers.

9. MAKE-OR-BUY DECISIONS

Maybe you can now make parts cheaper than you could buy them a year ago. Or *vice versa*. The difference could be in present excess production capacity. Point is, economic conditions have changed—and comparative prices may have, too.

10. STOCK ORDERS

Review orders in process for products going into your stock of semi-finished or finished goods. With lower demand you may get by with less stock. And lower backlog may give you more flexibility to produce orders more quickly.

If you can produce quickly enough you may let some stock items run out. This way, you'll postpone making for stock until you receive a customer's order. On the other hand, you may be better off to maintain higher inventories of raw and semi-finished materials in proportion to finished goods.

Whatever you do, you can be almost certain of one thing: The stock "max-mins" you used last year are obsolete for the time being.

11. LOT SIZES

These days, your orders are probably smaller. And you've got problems with economic lot size. Your solution: Look for chances to combine or arrange orders—or parts of orders—to minimize set-up and other fixed costs.

12. EXCESS CAPACITY

Can you sell excess machine and engineering time? Here's a chance to pick up extra income and fill work schedules. Best prospects may be customers and suppliers.

13. MAINTENANCE NEEDS

With curtailed operations you should need fewer spare parts and materials for repair and maintenance. Why? Because machine repair and maintenance should bear some relationship to operating hours. And because, with alternate production methods available for some processes, you can tolerate longer breakdown periods while you get parts you don't stock. With suppliers of these parts in the same situation, lead time should be less, too.

This is the time to take greater risks—calculated risks, to be sure—on downtime. That's better than risking the high cost of maintaining complete stores.

Your main objective: Maintain plant and equipment for production, quality, low cost. Defer projects that don't meet these needs.

14. JOB COMBINATIONS

Some jobs in the plant may not be full time, now that you're operating at lower levels. But they're jobs you can't eliminate. Here, then, is a chance to redistribute work to make fulltime jobs. Your search should include line and staff, departments and jobs. You might even combine two small departments to reduce overhead. You can restudy decentralization that worked well when volume was high, see if centralization would be better now.

One more thing: Consider generalization now, where specialization was justifiable a year ago.

15. PAPERWORK

If you haven't surveyed your paperwork for some time, you may find some quick savings here. Reports that started in high-volume times may now be meaningless—or of doubtful value. You might ask, "Are copies going to anybody who doesn't use them?" It costs money to study a useless report.

First thing you should do is assign somebody the job of tracing every piece of paperwork from original to file. Objectives: Eliminate forms (or copies). Simplify (by eliminating non-essential data from a report, for instance). Combine (to eliminate duplication).

16. SUGGESTION PLAN

Stress it. And emphasize money-saving ideas. Fast processing of suggestions will convince employees of the need to cut costs.

Give the results publicity. And if you've thought about increasing payments for suggestions, make the change now. It will raise costs—but increase savings, too.

17. COST HISTORY

One thing you might do is compare today's operating data with experience of similar periods—1949 and 1954, for example. You can compare labor hours per sales dollar, if you have an index to adjust product prices. Or compare labor expense to sales dollar ratios. Also it's possible to compare material, supplies, maintenance, overhead, and other costs. Some comparisons, because of changes that have taken place, will be so complex as to be of doubtful value. So don't waste much time on these. Other comparisons will be simpler and altogether useful in strengthening your program.

18. WASTE

Now's the time to declare all-out war on it. Try to plug leaks of all kinds—production materials, supplies, utilities, time, lost-time accidents, and the like. Also take a look at the possibilities in prompt repairs of rejects and in boosting the value of scrap by careful segregation. Bonus benefit: From your waste reduction program your employees, too, will catch the spirit of cost consciousness, make it company-wide.

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FACTORY
MANAGEMENT AND MAINTENANCE

HUMAN RELATIONS

By LESTER R. BITTEL, Manager, Editorial Programs, FACTORY

What Price Talent?

If time to train is a measure of value, skills come pretty high these days. Listen to The Warner & Swasey Company, Cleveland, where training and education are recognized as cornerstones:

"We have found that it takes about three years to train a field engineer and six years to train a serviceman so that he can cope with the range of customers' problems. We have found that it takes three to five years to develop the supervisory skill and know-how needed to meet the exacting requirements of precision manufacture."

This quote appeared in Warner & Swasey's 1957 report to shareholders.

Watch Your Dust

Ten per cent of all work accidents resulting in death or permanent total disability are caused by dust and other harmful substances. Average cost per injury is $14,000 in wage compensation alone. Source of this information is E. L. Alpaugh, director of industrial hygiene for the National Safety Council.

Good housekeeping and grounding of machinery to remove static electricity are partial answers to the dust problem. Then the National Safety Council gives seven basic rules:

1. Isolate dust-producing operations.
2. Substitute non-dust-producing methods wherever possible.
3. Provide protective devices for workers.
4. Give workers periodic medical exams, x-rays.
5. Wet dust at source of production.
6. Install local exhaust systems at dust sources.
7. Consider dust problems in new plant plans.

But the problem is never solved for all time. New dust hazards have a way of springing up with new processes. So when you've licked your present problems, put a tickler in your file for next year.

Books for the Kids

The signs above the racks read: "The books on these shelves are books that small children will enjoy. Take one home with you to read to your children. They will have a good time and so will you. Bring it back when you and your children have finished it together so other families may enjoy it too." During the first year, Automatic Transportation Company's (Chicago, Ill.) librarian estimates that every one of the original 156 books has been checked out at least a dozen times.

The idea for the program came from Yale & Towne Manufacturing Company's president, Gilbert W. Chapman. He's chairman of the National Book Committee and an advocate of reading aloud to children at home and elsewhere.

Lack of red tape makes the lending service easy for employees. Racks in plant and office are open to selection without signature or any record that identifies the borrower. The employee is asked to drop an unsigned book card into a box near the rack. Cards serve as a register of each book's use. If any book is out too long, its title is posted on the bulletin board as a reminder to the borrower.

Selection comes from the large list recommended for children under six by the National Book Committee. The list was condensed by the children's librarian at the local public library. The books run the gamut from nursery rhymes to Robert Louis Stevenson's poems for children. New additions are posted on the bulletin board.

Employees are not held responsible for damage to books. In fact, parents are encouraged to let the kids handle the books, to get the feel of them. Books returned in irreparable condition are replaced without question.

Employee response is best measured by the library's use, but workers are free with their praise. At least 5000 children have enjoyed the books.

Initial outlay for the program was only $250—for books and shelves. And it reaches employees "where they live."

More on Music

Where does background music make its sharpest impression on employee behavior? Absenteeism? Lateness? Turnover? Nope. Latest research seems to show that background music is most effective in increasing productivity and reducing errors.

For years the proponents of background music have talked about its ability to reduce employee tension—and consequently to remove maladjustment symptoms such as lateness, quits, and absences. Now a study made by an independent investigator (Stevenson, Jordan, & Harrison, Inc.) for Muzak Corporation indicates that improvement in attendance through the use of background music is far from predictable. But in each of four studies of office workers, background music made measurable, significant improvements in productivity or quality of work.

For example, mail inserters upped performance 8%. Check typers decreased their errors 38%. Keypunch operators increased production 18% and cut errors 37%. Concurrently there was no significant change in attendance for the mail inserters (although late arrivals dropped 36%). In another case, turnover of ticket agents dropped 53%, while lateness and absences remained about the same.

Since the researchers were careful to guard against the "Hawthorne Effect" (changes in employee productivity caused by an awareness that reactions to environmental changes are being observed), the results of these carefully conducted studies can be judged as reliable.

If you'd like to know more about the study, write for a free copy to Department FM, Muzak Corporation, 229 Fourth Ave., New York 3.

Short Gains, Lasting Damage

Many executives in their desires to achieve immediate gains in productivity do so at the expense of irreparable damage to the plant organization. That's the conclusion of famed human relations researcher, Rensis Likert, of the Institute of Social Research, University of Michigan.

"Pressure-oriented, threatening supervision can achieve impressive short-run results, particularly when coupled with high technical competency," says Likert in the *Harvard Business Review* (March-April 1958). This effectiveness will last for at least a year, he warns. But a new study shows that simultaneously the organization is weakened by a loss in employee attitudes toward:

. . . *Responsibility* for getting the work done.

. . . *Higher producers* in his group.

. . . *His supervisor.*

This latter effect becomes measurable only after the human relations assets have been liquidated. "Such measurements as absence, turnover, and scrap loss reflect changes in the human organization *after* they have become substantial," says Likert. "More sensitive and more current measures are needed."

What does this mean to the opportunistic manager? Says Likert: "The executive who milks the human franchise today will not be in a position to show good profit-and-loss figures tomorrow."

Scriptures, Anyone?

To 100 employees of Convair Division of General Dynamics Corporation, San Diego, the lunch break is also a Bible break. Four groups of employees meet voluntarily on their lunchtime for Bible study. The groups are inter-denominational and the company provides conference rooms free.

What better way to fill your conference rooms during the lunch hour?

Pamphlets Are Popular

If you've been wondering whether your reading racks pay off, research completed by Lawrence C. Lovejoy of New York University clearly shows that employees like the service.

The research was based on 6111 questionnaires filled out by employees in 35 companies, a 20% return from the 30,294 forms passed out. Some of the key results as published in *Personnel* magazine:

. . . *Ninety-two per cent* of respondents pick up booklets, at least occasionally.

. . . *Ninety-one per cent* read them—at least, read them occasionally.

. . . *Eighty-seven per cent* take booklets home.

. . . *Fifty-seven per cent* pass them on to two or more others outside the plant.

. . . *Eighty-seven per cent* feel the program should be continued.

So if it's participation you want, take heart from these results.

Spraying a reflective coating on a roof is easy to do. And . . .

Slashing Roof Repair Costs 30%

This four-step plan—plus standard procedures for five recurring and worrisome jobs—will give you a brand-new weapon against your roof maintenance costs.

OVER FIVE-million square feet. That's the size of our roof maintenance problem (photo above) at Lockheed Aircraft Corporation plants in Southern California and elsewhere in the nation.

That's a lot of roof to care for. Cost of our roof maintenance is a hefty figure, too. That's why Lockheed has developed a roof maintenance program that might well serve as a model for many other plants.

The cost? It's our belief the only sound approach to roof cost is long-term—from 20 to 40 years. Roofing costs for the average plant in our West Coast area averaged at least $1.50 per 100 square feet per year over a long period. But our costs will gradually slide down to $1, on the same basis, as the program takes hold.

Why the difference? Because we've taken four main steps to low-cost roof maintenance. We've done it this way:

. . . *Standardized* our approach to roof repairs.

. . . *Improved* efficiency in applying roofing materials.

. . . *Simplified* inventory.

. . . *Boosted* quantity purchases of maintenance material.

Two other cost-cutters: Our own employees make all our minor repairs. Several men in each plant have taken a repair methods course.

But don't take this $1 average cost as a set figure. The actual cost of maintaining and recovering roofs depends on many factors: size and accessibility of area, type of structure, kind and condition of roofing, metal and flashing work needed. These conditions dictate the specifications for care and repair. And the specs can be burdensome if you don't watch out.

CENTRALIZING REPAIRS

Lockheed has boiled its roof repair needs down to just five basic specifications to cover all conditions on many types of roofs.

By FRANK FROST
Assistant Maintenance Superintendent
Lockheed Aircraft Corporation
Burbank, Calif.

. . . it's fast, low-cost.

Here's how they came about: Until a few years ago each Lockheed plant handled its own roof maintenance. Deciding on repair or replacement of roof, method of repair, type of roofing to use—all was left to individuals in each location.

If we were to economize, management knew we had to coordinate roof problems on a long-term basis. First move was to bring the direction and control of roof maintenance back to the home office at Burbank. Plant maintenance at Burbank took over our accumulation of buildings, which had grown like Topsy.

Next move was an accurate appraisal of all our roof areas as to age, type, condition, repairability. Then we set up basic maintenance specification standards to get comparable bids from contractors. We also set up uniform repair procedures for work we would do ourselves. In these steps we sought to use labor-saving devices wherever possible. One example: mechanized equipment for delivering materials from ground to roof.

We called in representatives of leading roofing material manufacturers and studied the methods and ideas they submitted. Materials were tested in the laboratory and the field.

Finally, we decided to adopt the products and recommendations of one older manufacturer. He had a long, successful record of roof maintenance in other plants. His program didn't stop with selling the roofing, but continued with emphasis on how to prolong roof life through renewed applications of protective and reflective coatings. Another consideration was our ability to pinpoint responsibility for results on one supplier. Also, because of the exclusive set-up, the manufacturer could afford to provide several mutually beneficial consultation services: inspection of roof areas, technical advice in preparation of guide specification, and complete inspection service during application.

We're using our specifications in all types of American climates. The timing of roofing work, of course, depends on local weather. Roofs of all Lockheed plants are inspected in the early fall. At this time we clean downspouts, gutters, and roof drains and remove all débris. If inspection shows the need of a complete recover job, it's done the following summer.

Since starting the program we've kept a record of all roof contracts. It shows date work was done, contract price, and specification used. These summary data are also marked on some part of the building, usually a firewall.

For a look at our specifications for roof repairs, read on.

How to handle five roof problems

1. ROOF THAT'S FAR GONE

Here's the procedure we use on worn-out built-up roofing that's too far gone for further repair: Two layers of 50-lb. surfaced cap sheet are laid over the old roofing with either a cold adhesive or hot asphalt—lapped 19 inches. Over this new-laid membrane we apply (usually by spray) an elastomer-treated asphalt emulsion. We apply it at the rate of 4 to 5 gallons per square. Where we want reflectivity on the roof we apply a final reflective coat —either an asphalt emulsion (pigmented with titanium dioxide) or an aluminum roof coating.

The advantages of this type of specification for re-roofing work are many. First of all, old roofs usually provide anything but a smooth surface for new roofing. By using two layers of a light pliable sheet and by lapping 19 inches, we manage to avoid wrinkles and "fishmouths" (large openings caused by lack of bond between plies). By immediately coating the two new layers of roofing with the elastomer-treated asphalt emulsion, we can minimize the devastating effects of sun and night moisture on composition roofing. The "waterproofing membrane" thus remains "live" for years, requiring only periodic recoating (every 7 to 10 years) to assure service far beyond the life expectancy of the usual built-up roof.

Added weight to old roof structures can be a serious problem. Often the building will withstand only one more layer of roofing before a complete tear-off is required. This is costly—and can completely disrupt production operations. By protecting what we have at the outset and providing for a low-cost recoating program, we project the dread prospect of a complete tear-off far into the future.

A distinct advantage of this specification is that Lockheed's own maintenance men—when necessary —can apply the same kind of roof as the roofing contractor; i.e., a cold adhesive. This way, our less experienced people avoid "hot kettle" dangers and inconveniences. Also, they don't have to put up with objectionable hot asphalt fumes. These are important factors around an aircraft plant like Lockheed, where tight security often requires company men to perform tasks usually sent out for competitive contract.

2. NOT-SO-BAD ROOF

Here's what we do for composition roofing that needs repair but is not badly deteriorated. First the roof is thoroughly cleaned of dust, dirt, and débris. Next, fishmouths

Begins on page 118

"Reflective coating prolongs roof life"

and blisters are cut and repaired to make the surface clean, smooth, and watertight (see No. 5 below). The elastomer-treated coating is then applied at the rate of about 4 to 5 gallons per "square" (100 square feet). Finally 2 gallons of reflective coating may be applied per square (see No. 3 below).

The heart of this specification is the protective coating. Where roofing can be made watertight by proper repairs, this elastomer-treated (clay-like) coating can then protect a weathered and repaired roof far beyond its normal life. The life expectancy of the coating itself is well known. Test panels at the manufacturer's laboratory have proved that a film thickness of 5 gallons per square can provide an unbroken film for over 20 years.

To those who are not familiar with this asphalt-emulsion roof coating, here's a brief background on its growing importance in modern industrial roof maintenance. You're familiar with the traditional "solid" asphalt, which is melted into a hot liquid for sealing roofing sheets together or for embedding gravel. Then there are the well-known "cutback" asphalt liquids (plastic cements, fibered coatings, primers, and the like), which are asphalt materials held in liquid form through the use of petroleum solvent that evaporates and hardens.

The lesser-known asphalt-emulsion coating—made of steam-refined asphalts lightly fibrated with asbestos—is flexible and does not crack or "alligator" when exposed to weather, as do hot asphalt and cutbacks. The asphalt-emulsion coating is stable and will not flow—even under intense heat. It's completely odorless, free of fumes, non-toxic, and non-flammable. Also it bonds securely to damp surfaces and does not carbonize—it simply oxidizes slowly from the surface down. It's understandable why a coating like this has become the heart of Lockheed's roof maintenance program.

3. ADDING A REFLECTIVE

To put a reflective color coat on a roof still in good shape (photo, pp. 118-19), we remove dust and dirt, make needed repairs. Then we apply an asphalt sealer-primer—1 gallon per square. When dry, we add a reflective coating (usually by spray)—2 gallons per square.

Naturally the primary use of a reflective coating is to reduce inside temperatures. But at Lockheed our studies indicate that the application of the reflective coating prolongs roofing life. This is especially true of asphalt-emulsion coating pigmented with titanium dioxide.

This type of emulsion has a much higher degree of reflectivity after an initial weathering period than a high-grade aluminum paint. Recent studies by the manufacturer of both types of coatings reveal that a high-paste content aluminum paint (3 pounds per gallon) has a much higher reflectivity than the pigmented emulsion coating when first applied. But after about 10 months' exposure, the curve of reflectivity of the emulsion crosses that of aluminum and attains a reflectivity 34% greater than that of the aluminum paint—maintaining this superiority as long as any coating remains.

In addition to reflectivity, the asphalt-emulsion pigmented material has other advantages. It enhances plant safety because the material will not support combustion, the fumes are non-toxic, and over-spray is reduced to a minimum. For airfield applications, here's an added benefit: Though a high degree of reflectivity is achieved, there is no glare that could blind a pilot even temporarily.

4. OLD METAL ROOF

Here's what we do to repair rusting, deteriorating flat or corrugated metal roofs that are not weatherproofed—and leak in the rainy season: We pull together loose sheets with drive screws at laps and fasten them securely to purlins. Over the entire roof area a ½-in. thick asphalt-treated and coated cane fiberboard sheathing is laid solid with drive screws. Over this new, smooth, insulating surface we apply the new roofing as described in No. 1 above.

This provides the building with a solid, weathertight roof—often a difficult assignment to accomplish where old corroded metal roofing is involved.

The insulating value of this specification can also prove valuable if temperature control is a factor. Not only does the cane fiberboard provide insulation. The dead air spaces in the valleys of the corrugations also add much to the over-all insulation value. Another advantage: Life of the interior paint on the underside of the metal is extended.

5. PATCHING A ROOF

We use the following method to patch or repair built-up roofing: Where splits, breaks, or weakened areas of roofing need repairing, the area around the split or break is cleaned. A layer of smooth roofing is embedded in a coat of industrial plastic cement. Over the break it extends out 4 inches on all sides. A layer of heavy-duty glass fabric embedded in the asphalt-emulsion protective coating is then applied over this strip of roofing. The fabric is extended out 4 inches beyond the edges of the roofing sheet and is completely covered with the emulsion coating.

This method of patching is the result of long study and experience with roof-repair procedures. It not only assures a successful weatherproof patch but also provides for protection of the repair materials. It also provides for movement, which is characteristic of old roofs. A reflective color coat can then be applied if desired.

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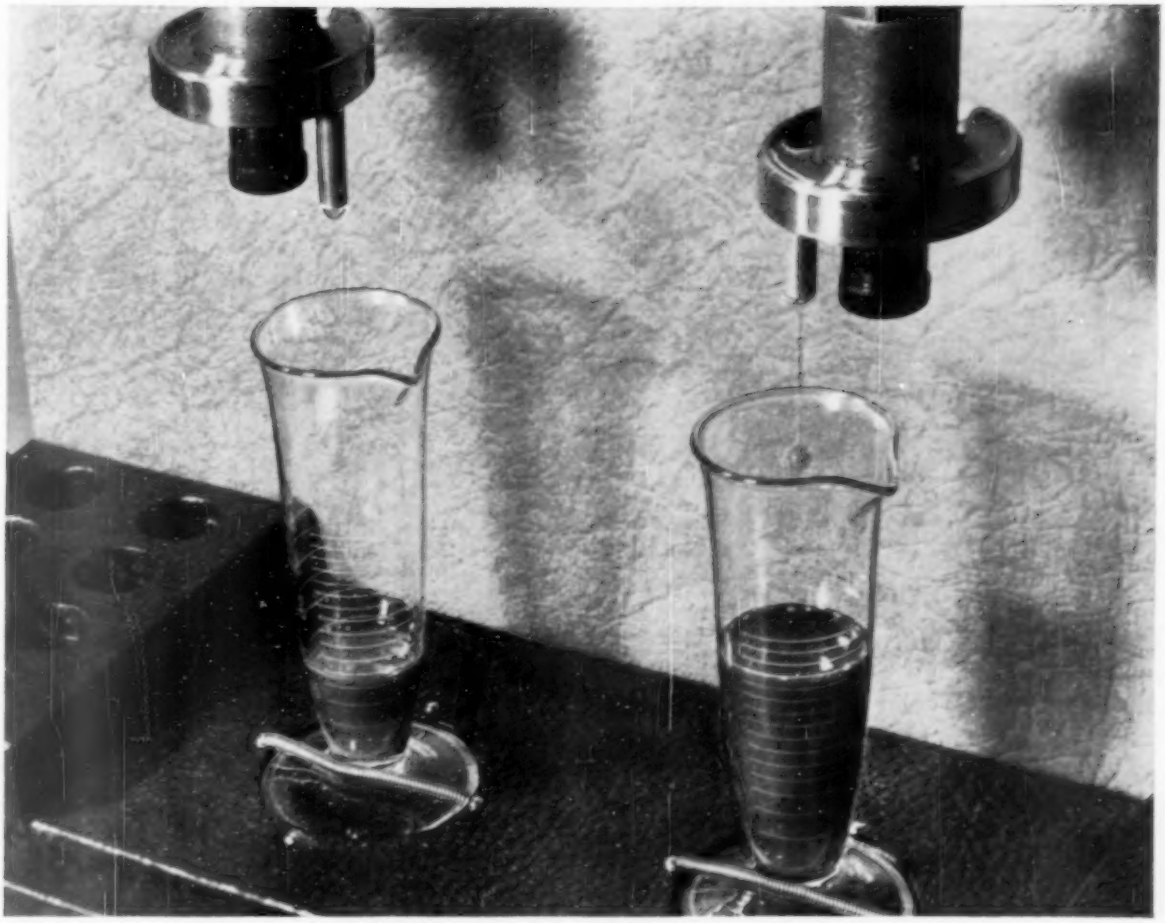

The oils collecting in these graduates are being forced, at 100 psi, through two sintered bronze bearings. Although each oil has the same viscosity, the Suntac on the left is leaking *only one quarter as much as* the straight oil on the right.

Desk-top demonstration proves that SUNTAC HYDRAULIC OILS can cut your oil losses . . . up to 75%

Suntac* oils are competitive in price, competitive in quality, *and unique in their ability to reduce oil leakage without costly shutdowns.*

Suntac oils are high-quality, exceptionally stable mineral oils especially compounded to reduce leakage. Experience proves that they give longer pump and seal life with higher overall operating efficiency.

See for yourself how a Suntac oil can cut your oil costs. A simple desk-top demonstration will show you how.

Ask your Sun man to show you how others have reduced oil consumption, or write to Dept. F-6

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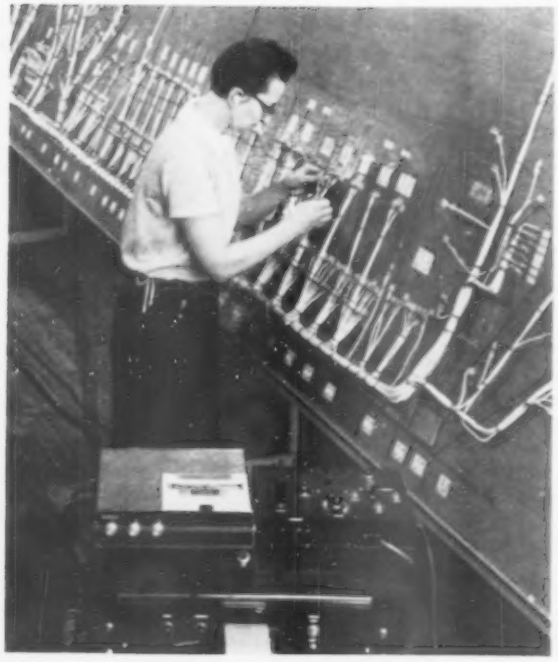


...assembly on the double

New—Taped Talk for More Output

This brand-new production booster will eliminate hard-to-follow manuals for complex assembly, speed slow work, lift quality, cut job-training time.

AIMO means "audibly instructed manufacturing operation." It's a new system (photos above) that can boost efficiency on a complex assembly operation as much as 100%.

Westinghouse's Headquarters Laboratory in Pittsburgh hatched the new system. Already three Westinghouse plants are using it. AIMO cuts paperwork and errors, reduces learning time of operators.

How it works—Engineer designs schematic wiring diagram. Specialist (left photo), who knows manufacturing routine, interprets diagram, then reads assembly instructions into recording machine. Assembler (right photo) plays record of directions, wires assembly accordingly.

Dictaphone Corporation made the machine for Westinghouse. It's a modified dictating and listening system. A built-in signal identifies the beginning and end of a block of instructions. Worker has a foot control to start and stop the player. Or, if necessary, worker can back up the player to get message repeated. In photo, assembler is using earpiece with cord attachment. If the job requires greater mobility than cord allows, assembler can attach a small audio receiver to his ear.

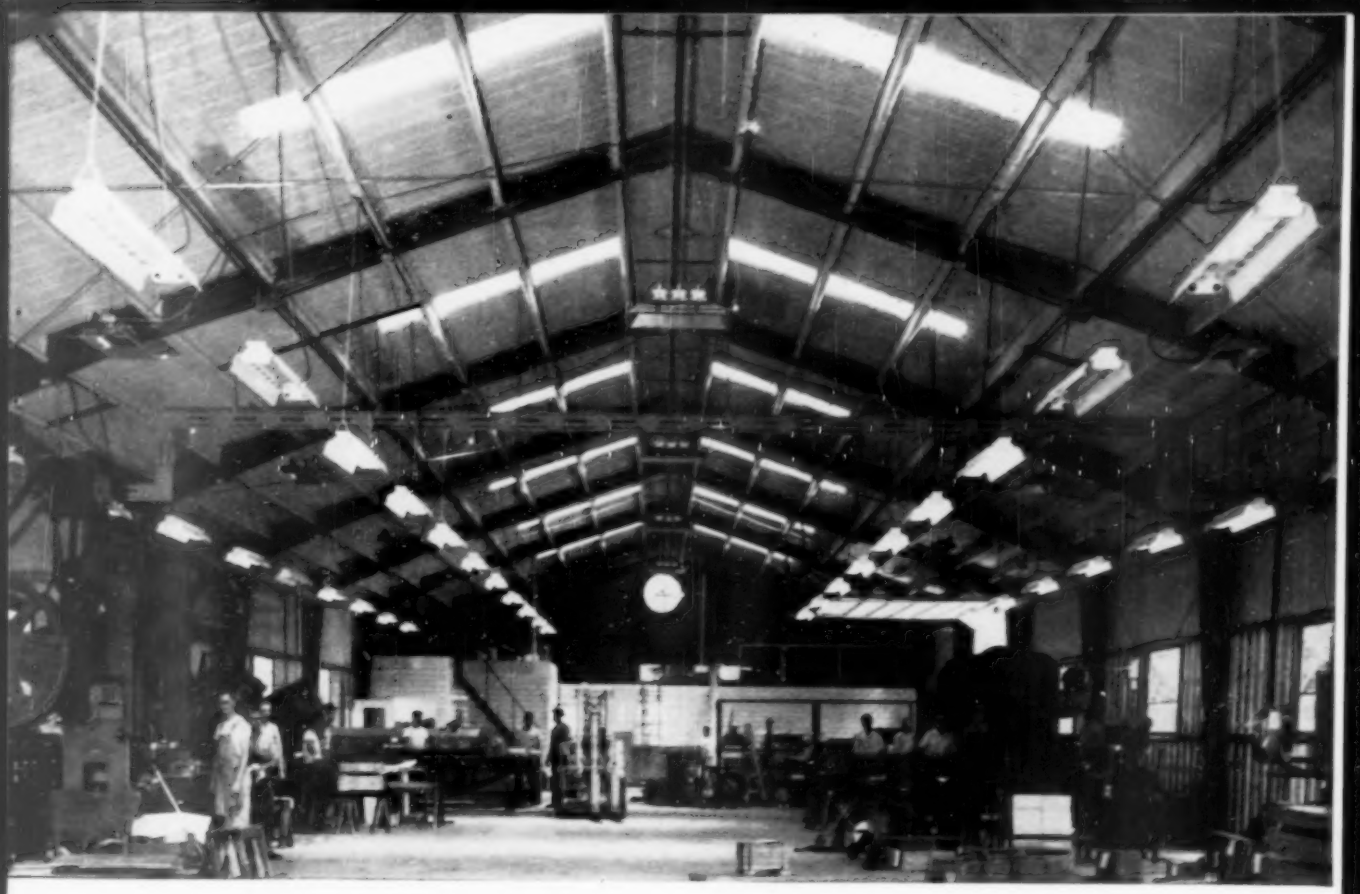
Neither paperwork nor drawings clog up the assembly areas or confuse the assembler. All information that's needed for manufacture and quality testing can be put on tape. Duplicate tapes take only a few minutes to make. And last-minute design changes cause no more trouble than it takes to splice in supplementary instructions.

Big pitfall—You guessed it: language. Instructions must be in words or symbols that can have only one interpretation. For example, here's a simplified version of our instruction: "5 point 13; 7 point 6." This tells the assembler to run a wire from Terminal 13 on Component 5 to Terminal 6 on Component 7. The point to remember is that any instruction that you can write you can also speak. Rather than write instructions for someone to read, we've found that it's far easier for an originator to speak and for an assembler to listen.

Possibilities for the future are endless. You can mail out a tape to instruct repairmen. Or you can flash complete instructions for modifications or fabrication of equipment anywhere in the world in a matter of minutes.

AIMO will be available soon. Cost will be moderate—from $600 to $700 for the player, $900 to $1000 for the recorder.

By SAMUEL FEIN, Senior Engineer
Controls Development
Headquarters Manufacturing Laboratory
Westinghouse Electric Corp., Pittsburgh



This factory-built steel building houses a production unit, several administrative offices, an engineering and drafting room, an employee recreation room, and washroom facilities. And it was built in only 800 man-hours!

Need more plant space?

You can't beat this kind of construction for a quick, cost-saving way to expand plant space. It saves time and labor because the structural steel framework and USS Galvanized Steel Sheets are pre-cut to standard sizes and ready to bolt together. No special tools and no skilled labor are needed. And when you move into a steel building, every inch of space is usable because the rigid steel framework and clear-span construction leave the whole floor area free for your use.

United States Steel produces USS Galvanized Steel Sheets, Structural and High Strength Steels which are used by the manufacturers of these buildings. We will be glad to see that you receive complete, free information about the kind of steel building you need.

United States Steel Corporation
Room 2831, 525 William Penn Place
Pittsburgh 30, Pa.

I'd like to have more information about factory-built steel buildings for the following uses: _____

_____

_____

Send information to:

Name _____

Street _____

City _____ **State** _____

(Your request for information will be forwarded to the manufacturers of these buildings and you will hear directly from them. There's no obligation on your part.)

United States Steel

USS

THADEMARK

For more facts circle 503 on Reader Service Card

CATALOG NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.

PRODUCTION

1—Optical Projectors. Here's an illustrated 16-page booklet (F2-126) that describes contour projectors and gives applications for optical gaging in toolroom, on production line, in receiving and inspection. Has specification chart, other data. *Eastman Kodak Co.*

2—Flame Cutting Machine. Design and performance features of multiple-torch model "56 Oxygraph Flame Cutting Machine" are covered in 16-page catalog (Form ADC-706D). Discusses gas distribution system and accessories. Photos and diagrams. *Air Reduction Sales Co.*

3—Finishing Equipment. Complete finishing system is outlined in detail in an 8-page bulletin (No. 600). Also discusses washers, ovens, spray booths, phosphatizing units, and the like. Includes helpful isometric drawings and photographs. *Schmieg Industries, Inc.*

4—Coolant Cleaning Equipment. Continuous cleaning of coolants and cutting oils is described in three illustrated bulletins. One (4 pages) tells the "whys" of coolant cleaning; No. 9020 (4 pages) discusses filters; No. 9000 (6 pages) explains separator. *Infilco, Inc.*

5—Gear Grinding Machines. Here's an illustrated 16-page catalog that tells all about single spindle bar automatics. Lists 10 features that insure fast set-up and maximum continuous production. Has floor plan and layout; specs. *The Gear Grinding Machine Co.*

6—Cutting Machines. This 28-page catalog (4487) describes machines in sizes from small portable to large multi-blowpipe shape-cutting machines that can reproduce thousands of patterns. Gives specs, illustrations of installations and accessories. *Linde Co.*

7—Presses. Bulletin No. 3300 (40 pages) describes and illustrates presses for producing laminated plastics, pressing dry ice, die hobbing, other applications. Includes conversion tables, decimal equivalents, other technical data. *Baldwin-Lima-Hamilton Corp.*

ELECTRICAL

8—Motor Controls. Illustrated 88-pager (GEC1260C) describes control devices. Selection charts cover starters through 200 hp., guide form specs, diagrams, dimensions, applications for each device. Indexed. *General Electric Co.*

9—Cable Supporting Systems. Here's a 60-page looseleaf catalog (No. 1257) with "latest" info on systems that include aluminum and galvanized steel cable trough, ladder, channel, and Rak-it system supports. Lists accessories. Thumb-tabbed. *Rome Cable Corp.*

10—Generators. Bulletin 51B8909 (4 pages) discusses line of redesigned synchronous generators. Provide economical standby or continuous service in sizes from 37.5 to 375 kva. Ratings from 30 to 150 kw. at 1800 rpm; 50 to 300 kw. at 1200. *Allis-Chalmers Mfg. Co.*

11—Latch Relays. Bulletin 7305-PML (4 pages) outlines features of new latch relays and pictures 9 standard models with from two to ten poles. Tabulates numbers of circuits and combinations of normally open and closed contacts; gives dimensions. *Clark Controller Co.*

12—Lighting and Fixtures. Handy-size illustrated 54-page manual (Form No. E8) tells all about good lighting practice. Gives factors to be considered in planning new lighting, lists lamps and fixtures. Includes diagrams and charts index. *Champion Lamp Works.*

13—Footswitches. More than 75 models covering about every conceivable footswitch need are listed in this 4-page catalog (No. 57), with photos. Sets forth specs on each switch: contact type, stage, pole, throw, phase, rating, size, etc. *Linemaster Switch Corp.*

14—Quick-Change Connectors. This 4-page booklet (B68) describes new type of "change-out" connector sets that make electric cables quickly detachable from portable equipment. Connectors and switches are heavy-duty, moisture-tight, and oil-resistant. *Joy Mfg. Co.*

15—Rectifier Equipment. Bulletin GEC-1485 (4 pages) describes high-quality, "self-protected," silicon power conversion units for general-purpose applications. Ratings, application and performance data. *General Electric Co.*

AUXILIARY

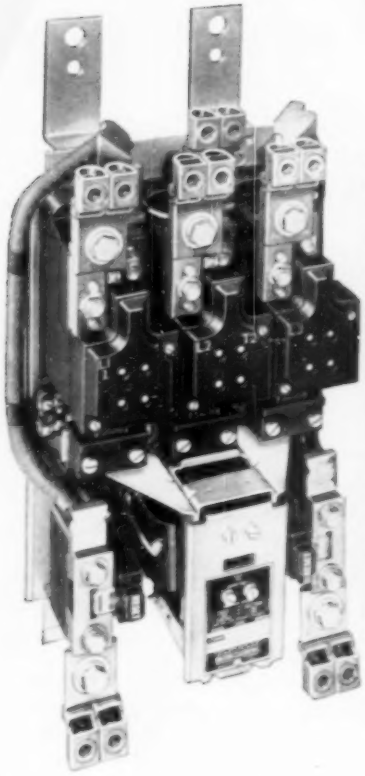
16—Centrifugal Pump. Bulletin No. 144 (8 pages) describes pump of the volute type for horizontal or vertical installation. Diagram shows use of pump in hot or chilled water air conditioning systems. Other diagrams, selection chart, fitting data. *Dunham-Bush, Inc.*

17—Stationary Compressors. These four pages explain advantages of maker's rotary design and how it contributes to true multiple stage

OTHER CATALOGS

Mechanical ..... p. 126
Materials ..... p. 126
Building and Equipment ..... p. 214
Instruments and Controls ..... p. 216
Maintenance ..... p. 218
Pipes and Fittings ..... p. 220
Materials Handling ..... p. 222
Miscellaneous ..... p. 223

NEW



SQUARE D
Vertical Action
SIZE 5 STARTER

Smaller! REQUIRES ONLY 270 SQUARE INCHES OF SPACE

DESIGN LEADERSHIP FEATURES IN SQUARE D's COMPLETE LINE OF VERTICAL ACTION STARTERS—SIZE 0 through 5

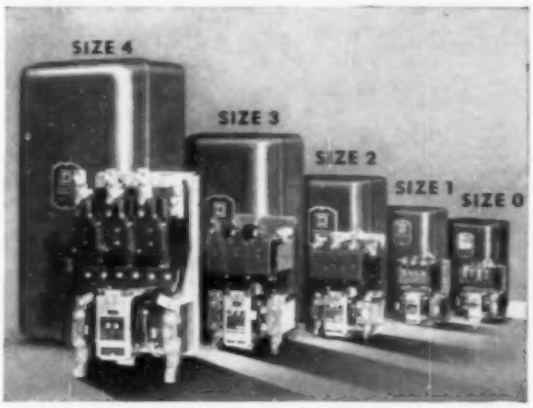
What's most important in a motor starter?

Performance and **long life** come first, naturally—and Square D's straight line guided motion and heavy-duty silver alloy contacts assure both. But that's only the beginning—

Fast wiring is important, too. Square D gives you a lot of wiring space and time-saving solderless terminals.

Easy maintenance rates high. The coils, contacts and overload relays on all Square D starters can be changed in a jiffy...without disturbing external connections. A screwdriver is all you need. And—

"Off-the-Shelf" Parts Kits make normal maintenance and "on-the-job" modifications easier than ever. Packaged parts include interlocks, contacts, coils, overload relays, pushbuttons and selector switches. They're easy to buy, easy to identify and faster to install.



For the complete story, write for Bulletin 8536
Square D Company, 4041 N. Richards St., Milwaukee, 12, Wis.

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

For more facts circle 504 on Reader Service Card

AIR-GRIP
CLUTCHES
Amazing sensitivity—instant response!

DIAMOND D
CLUTCHES
Rugged! Compact! Completely enclosed!

ROLLING GRIP
CLUTCHES
Positive! Smooth! No toggles!

•

FREE Engineering Catalog!

320 pages of helpful information and technical data on Dodge products. Virtually a manual on mechanical power transmission machinery. Sent free if requested on your company letterhead. Please give your title.

DODGE MANUFACTURING CORPORATION
400 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more about these items, circle numbers on Reader Service Card next to back cover.

compression. Bulletin E-269 gives specs for compressors and accessories. Rotaries are available in 20 to 40 hp. *Davey Compressor Co.*

18—Propeller Fan Cooling Towers. Belt-drive, direct-drive, and take-apart models in capacities of 2 to 125 tons are shown and described in 8-page Bulletin EC-500. Contains 12 installation suggestions, rating data, detailed dimensions, photos. *Halstead & Mitchell.*

19—Steam Fan Heater. Illustrated Bulletin No. 109 (2-pager) tells how fan heater utilizes the latent heat of high-pressure steam without complex piping, pressure-reducing stations, or expensive accessories. *Niagara Blower Co.*

20—Glassed Centrifugal Pump. Facts booklet titled "It's What's Inside that Counts" (Form 5281-J, 16 pages) contains answers to over 30 frequently asked questions about this pump. Gives brief history of its development. Shows photos, diagrams. *Goulds Pumps, Inc.*

21—Cylinders. Two bulletins: A-101 is an 8-pager that discusses 150-psi. air cylinders and accessories; H-101, also 8 pages, describes 2000-psi. hydraulic cylinders. Each booklet includes dimension tables, many diagrams, and photographs. *Teer, Wickwire & Co.*

MECHANICAL

22—Controlled Speed Systems. Here's an illustrated 8-page booklet (F-1952) that covers typical installations for controlled automatic variable speed systems. Shows applications, including those for control of liquid level, pressure, etc. *U. S. Electrical Motors Inc.*

23—Reducers and Gears. Speed reducers and special and stock gears are described in handy-size Catalog No. 80 (180 pages). Includes info on eight basic types of reducers: sizes, ranges, capacities. Illustrations, schematic drawings, specifications. *Grant Gear Works.*

24—Hydraulic Systems. Technical Bulletin B-4 is a newly revised 44-pager entitled "Hydraulic Fundamentals and Industrial Hydraulic Oils." This illustrated guidebook gives principles of hydraulic systems. Sections on oil selection, trouble-shooting. *Sun Oil Co.*

MATERIALS

25—Aluminum Chemicals. Illustrated 48-page handbook includes info on sources of aluminum chemicals, major uses, products, and quality control. Summarizes technology of present applications and suggests "new uses without end" for these chemicals. *Reynolds Metals Co.*

26—Roof Coating. Bulletin A-525 (4 pages) describes Fibre Glass Supercote, a coating with no cold flow up to 140 F. For use over felt composition, tin and corrugated iron, concrete, built-up roofs. Photos. *The Garland Co.*

27—Boron Nitride, Silicon Carbide. Two 4-page bulletins cover: Boron nitride, which is an easily machined impermeable ceramic, for vacuum tube separators, molten pump parts, etc.; KT silicon carbide, self-bonded, for ball mill liners, etc. *The Carborundum Co.*

28—Polysulfide Polymers. Developments in applications of these liquid polymers are given in 8-page Bulletin 2-58. Data on uses of aluminum and carbonate-type fillers. Lists additives for improved glass adhesion. *Thiokol Chemical Corp.*

29—Aluminized Steel. This 24-page manual (PO4157) on aluminum-coated steel Type 2 covers atmospheric corrosion resistance, mechanical properties of the steel base, resistance to fire damage, and high heat reflectivity. Gives sizes, gages, etc. *Armco Steel Corp.*

30—Urethane Foam. This folder (A-5430), with four samples attached, discusses present and potential applications. Four urethanes

Turn to page 214

DODGE PILLOW BLOCKS

Timken Bearing Equipped

America's super-quality line—with a 34-year record of keeping performance *up* and costs *down!* Five types—to fit practically any service condition. All assembled, adjusted, lubricated and *sealed* at the factory for precision performance—long life—dependability.

SPECIAL DUTY TYPE →

- Designed for extreme precision and high load capacities.
- Fully self-aligning.
- Special Duplex Timken Roller Bearing with tapered bore.
- Split tapered sleeve with straight cylindrical bore extends through entire length of housing.
- Easy to mount or demount. Adapter nut (or collar) clamps adapter sleeve to shaft with extreme firmness.
- Automotive type piston ring seals. Bearing is sealed both on and off the shaft.
- Rugged semisteel outer housing.
- Elongated bolt holes provide for lateral adjustment.
- Special dust cap protects lubrication fitting.
- Shaft sizes 1½" to 8". Ask your local Dodge Distributor—or write us for Bulletin A670 giving complete technical data on America's most complete line of mounted bearings.

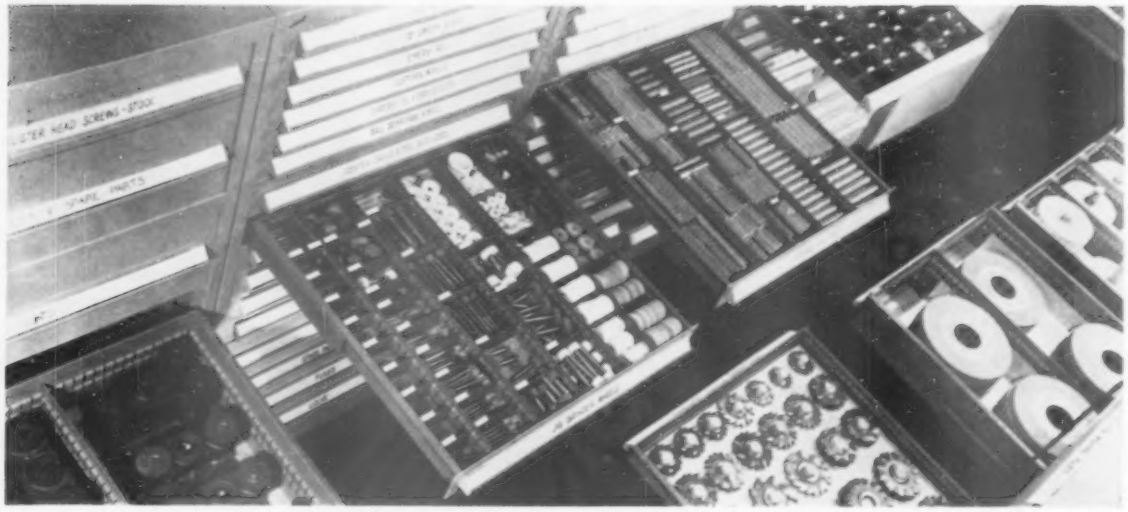
DODGE MANUFACTURING CORPORATION, 400 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

DODGE
of Mishawaka, Ind.

For more facts circle 506 on Reader Service Card

For more about these items, circle numbers on Reader Service Card next to back cover.



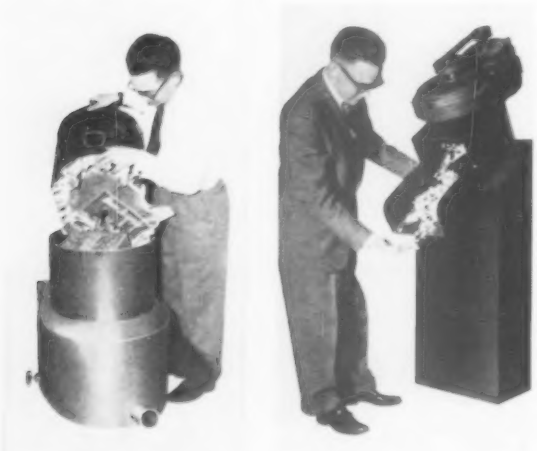
Tailor-Made Storage for Big Space-Savings

Modular storage system based on interchangeable component cabinets provides versatile interior arrangements for plants using large inventories of tools, parts, instruments, and assemblies. System makes every stored item quickly accessible and at the same time affords visual inventory control and avoids pilferage. Banks of cabinets (in a toolcrib, for example) can be locked at the turn of a single handle.

The Vidmar system starts with cabinet housings made in six sizes. All housings measure 30x27¾ in., vary in height from 27 in. (bench-level) to 10 ft. Storage drawers to fit the housings are available in 12 different heights, can be partitioned from side to side or from front to rear to hold a variety of items. Each drawer holds up to 400 lb. and rolls out easily to expose entire contents. A basic 5-ft.-high cabinet with 15 drawers costs about $400.

Vidmar, Inc. (Circle 101, Reader Service Card.)

Turning Garbage Into Odorless Pulp in a Jiffy



IT GOES IN HERE . . . . . COMES OUT HERE

Only thing this disposal unit *doesn't* waste is effort. Everything else—garbage, glass, paper, other waste—is quickly converted to odorless, semi-dry pulp that's easily handled as compost. The unit shown, consisting of a pulper, pump, and extruder, will dispose of some 800 lb. of garbage an hour—reducing garbage 80% by volume, cartons up to 20 to 1. Another larger unit available can handle a ton of waste per hour.

Operation is automatic, by pushbutton. The pulping unit, only 30 in. high, is located wherever trash accumulates—at the end of a conveyor belt, in a cafeteria, even in a closet. All refuse is dumped into tank and a small amount of water added to change waste to liquid pulp. Liquid pulp is then discharged through small holes at bottom of tank into a pipe that's connected to the extruder. And extruder removes the water and pushes the odorless pulp into a waiting container. Waste water flows into the sewer line.

Conservomatic Corp. (102, Reader Service Card.)

Turn the page

helps custodians where they need help most

Industrial washrooms need a program of penetrating cleanliness that kills bacteria, suppresses odors, removes drain build-ups, even discourages waste while encouraging good hygiene.

What's involved?

The three sensible steps of the West Protective Sanitation Program. An inexpensive way to help custodians where they need help most.

What does it include?

First, a scientific, heavy-duty cleaning of washroom facilities at regular intervals as traffic requires. This insures sanitary conditions. Cleans thoroughly. Destroys germs that cause T.B., Polio, Typhoid, Influenza and other diseases. Prevents drain clogging. And provides for continuous freshening of air.

Second, training for custodians so that they know how to maintain high standards of sanitation between heavy-duty cleanings.

Third, an analysis of washroom equipment that often leads to easier maintenance as well as savings in towels, soap and other supplies.

The West Protective Sanitation Program frequently prevents enough waste to pay for itself. Why not talk it over with a West Sanitation Specialist. Just write. Or call your local West office.

Programs and Specialties for Protective Sanitation and Preventive Maintenance

WEST CHEMICAL PRODUCTS INC.

WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC., 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

☐ Please send information on the West Protective Sanitation Program.
☐ Please have a West Representative telephone for an appointment.

Name_____

Position_____

Mail this coupon with your letterhead to Dept. 14

For more facts circle 507 on Reader Service Card

4 plant headaches disappear...

VANDALISM

PILFERAGE OF OUTDOOR STORES

TRAFFIC SUPERVISION

with 1 Anchor Fence®

TRESPASSING

You can wipe out these persistent problems of management, permanently, with one decision—installation of an Anchor chain link Fence. Anchor's exclusive, square terminal posts give you added security by removing potential toe and hand holds. You'll be proud of Anchor's clean-cut gate appearance and construction—designed to stand up under years of heavy use.

Every Anchor Fence is backed by a 66-year reputation as the industrial fence that gives you maximum security at low initial cost and virtually no annual upkeep. Remember, Anchor Fence is galvanized *after* weaving for extra-long life. Call your local Anchor office for a free estimate today, or write: ANCHOR FENCE, 6640 Eastern Avenue, Baltimore 24, Maryland.

ANCHOR FENCE

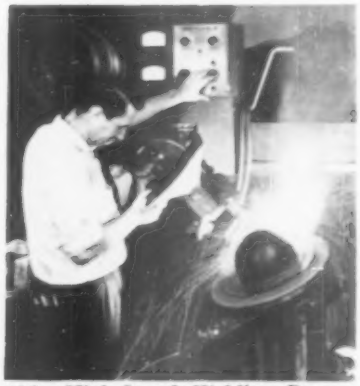
Division of ANCHOR POST PRODUCTS, INC.

Plants in: Baltimore, Md.; Houston, Texas; and Whittier, Cal. Sold direct from factory branches and warehouses in all principal cities

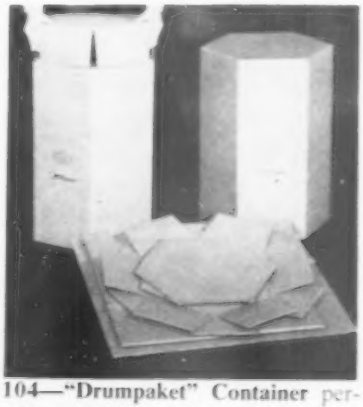
FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



103—High-Speed Welding Process arc-welds steel at speeds to 300 in./min. Process uses a flux-containing, coiled-wire electrode that produces a vapor shielding for an open arc; no fluxing or shielding agents are added to arc from external sources. *Lincoln Electric Co.*



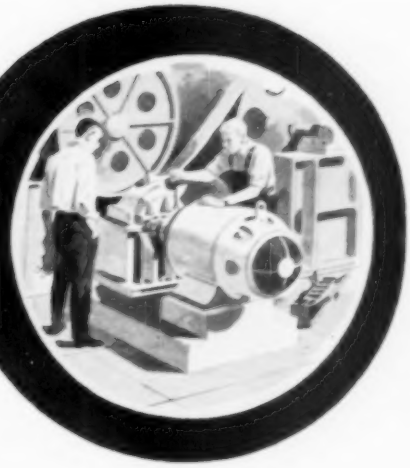
104—"Drumpaket" Container permits self-locking of top and bottom caps into the body and eliminates the need for closing equipment, steel strapping, or tape. Comes in varied sizes (2½ to 62 gal.) and shapes, delivered knocked-down to user. *Gaylord Container Corp.*

105—Packaged Automatic Boiler (Model 5 Powermaster) is offered in both high pressure (150 psi.) and low pressure designs for steam or hot water service. Electronic programing and safety controls are provided on 15-, 20-, and 30-hp. sizes. *Orr & Sembower, Inc.*

Turn the page

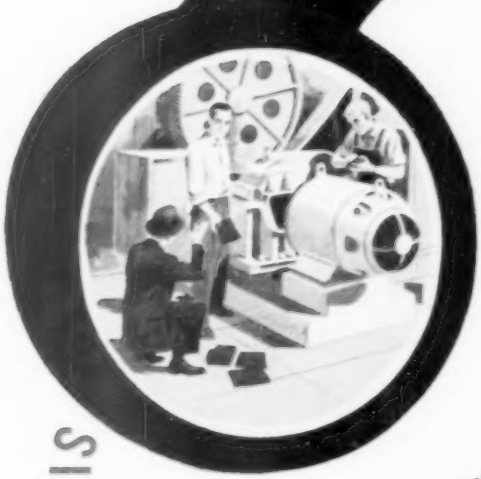
OIL SEALS

FAST!



when and where

YOU NEED THEM!



SIMPLY CALL YOUR NATIONAL OIL SEAL DISTRIBUTOR

Please don't tolerate costly delays getting replacement oil seals for your machinery. Call your National Seal distributor. He handles National's big complete line of "original-equipment" quality industrial seals — National Micro-Torc leather, National Syntech® synthetic rubber. Hundreds of types and sizes, stocked locally, plus complete technical help. Got the number of your National Seal distributor handy? If not, look him up, or call Federal-Mogul Service for his name and number!

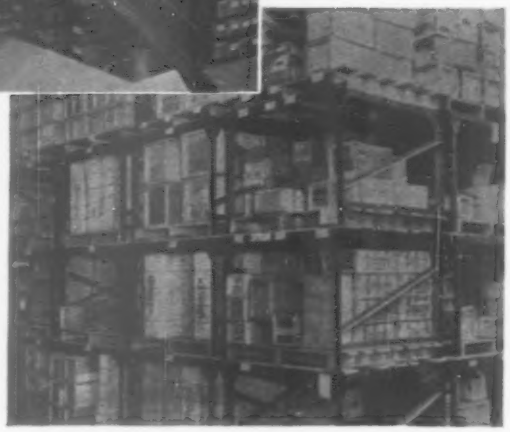
FEDERAL-MOGUL SERVICE
Division of Federal-Mogul-Bower Bearings, Inc.
Detroit 13, Michigan

NATIONAL OIL SEALS

For more facts circle 509 on Reader Service Card

PLANNED STORAGE
... ASSURES MINIMUM SPACE AND HANDLING TIME

Steel catwalks on F-G-M long span Bulk Storage Racks utilize space up to the ceiling.



F-G-M Pallet Frames permit stacking on pallets of loose, irregular or crushable loads with full access to materials stored at all times.

Dimensions, weights, physical properties, volume and turnover of material into and out of your plant form a highly individual distribution pattern. To assure maximum efficiency in handling and storage, investigate F-G-M Planned Storage.

Time-proved F-G-M systems require minimum floor space, minimum manpower, cut factory costs. An F-G-M survey is yours for the asking.

Send today for your free copy of Bulletin No. 700-A on how to double your storage capacity. The Frick-Gallagher Mfg. Co., 108 S. Michigan Ave., Wellston, Ohio.

S-2

FRICK-GALLAGHER

BONDERIZED

STEEL EQUIPMENT FOR EVERY STORAGE NEED

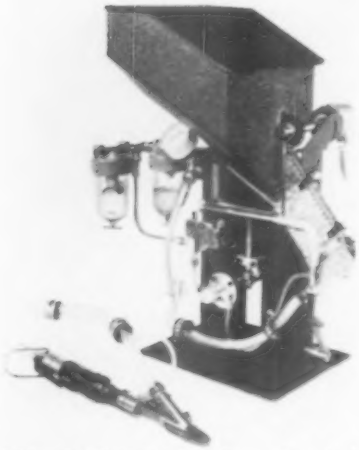
ROTABINS	STEEL SHELVING	WAREHOUSE RACKS	COUNTERS	SPECIALTIES

© 1957

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

106—Aluminum Electric Hoist, ¼- to 2-ton capacities, feature mechanically interlocked pushbutton controls. For convenience in pulling a trolley-mounted hoist, control cord incorporates a strain cable. Aluminum housing permits easy access to all parts. *Duff-Norton Co.*



107—Jet-Setter permits automated driving of all types of threaded fasteners—including those with preassembled washers—in confined locations. Driver head can be used at any angle; won't mar highly finished surfaces. *General American Transportation Corp.*

Turn the page

Earl Henderson, Assistant Cashier and Superintendent of Buildings for The Philadelphia National Bank, and John Kennedy, Main Office Building Supervisor, check the comfortable new officers' lounge. Says Mr. Henderson: "This room is part of extensive bank remodelling aimed at giving the public modern, efficient facilities and employees cheerful, comfortable working conditions."

Send for this Free Booklet!

...tells how to improve washroom efficiency, appearance with the help of **Scott's Washroom Advisory Service**

Facts, illustrations, diagrams, ideas! Everything you want to know about modern facilities and cheerful, efficient washrooms. It's all in this free booklet on Scott's Washroom Advisory Service. Send for it today. No charge or obligation, of course.

For "quick changes" and ideas on how to improve washrooms NOW, see Scott's 14-minute film on washroom planning! Just mail the coupon.

About 225 employees use the cheerful, efficient washroom-lounge facilities, part of which are shown here in the ladies' lounge. "The entire bank was re-done," says Mr. Henderson, "and of course the washrooms had to be as modern and well-planned as the rest of the project. That's why Scott's suggestions were welcomed. Scott Washroom Advisory Service worked with the architect. Results: excellent!"

Guards' washroom: recessed cabinets, off-the-floor equipment, tile walls and floor, modern lighting, scientifically planned soap supply, smooth traffic flow to washbowls, towels, disposal, exit. In short, this room—and 16 other washrooms serving 8 floors—embodies a great many of the principles of Scott's Washroom Advisory Service. (There is no charge or obligation for anyone calling on this service.)

SCOTT PAPER **WASHROOM ADVISORY SERVICE®**

Scott UHA Towels **Scott Multifold Towels**
Scott Singlefold Towels **ScotTissue**

For information on Scott recessed cabinets write: D. J. Alexander Corporation, 2944 East Venango Street, Philadelphia 34, Pa.

For more facts circle 511 on Reader Service Card

SCOTT PAPER COMPANY
Department F-86
Chester, Pennsylvania

☐ Please send me the free booklet on Scott's Washroom Advisory Service.
☐ Please let me see the Scott Washroom Film.

Name _____

Title _____

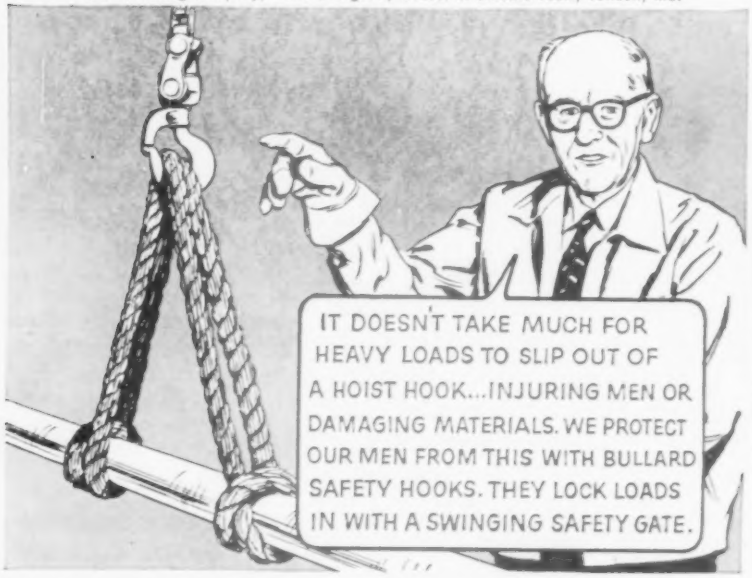
Company _____

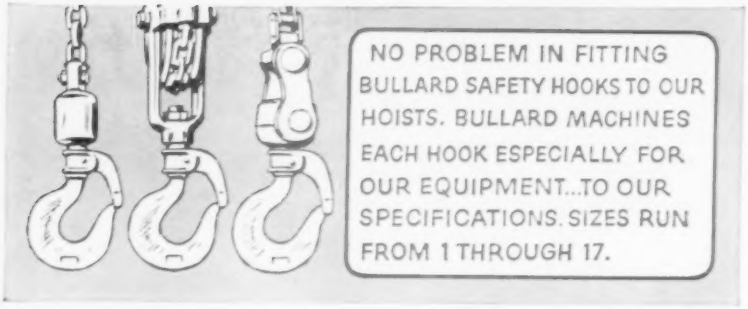
Address _____

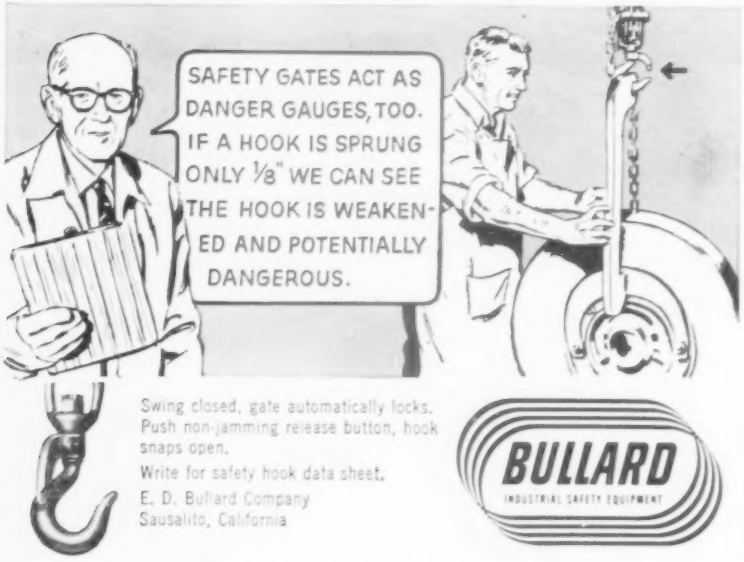
City _____ Zone _____ State _____

WHEREVER WE HAVE HOISTS.... WE HAVE MECHANICAL SAFETY INSURANCE!

. . . says Charles S. Smickle, Safety and Health Manager of the Black & Decker Manufacturing Company, world's largest producer of Electric Tools, Towson, Md.







Swing closed, gate automatically locks. Push non-jamming release button, hook snaps open.

Write for safety hook data sheet.

E. D. Bullard Company
Sausalito, California

BULLARD
INDUSTRIAL SAFETY EQUIPMENT

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

108—Bild-A-Flex Steel Framing is quickly assembled to form everything from storage racks to shed-type buildings. Package contains 10 lengths of re-usable framing in 10- or 12-ft. sizes, plus 75 sets of matched nuts and bolts. *Berger Div. Republic Steel Corp.*

109—Mechanical Sound Detector is a light, portable unit that locates the smallest internal defects in moving machinery—pinpoints leaks in pressure or vacuum systems. No need to shut down equipment; no batteries or electrical connections necessary. *Burke & Co.*

110—Drum Dumping Attachments, quickly attached to fork trucks, improve drum handling. Handle up to 2000-lb. drums with as much as 8-in. height variance; permit partial or complete dumping of container contents. Truck driver controls operation. *Kughler Development Corp.*

Turn the page

In zero weather this warehouse was heated at a monthly cost of less than a penny per square foot

During last January's sub-zero weather, Dravo *Counterflo* heaters maintained a comfort-heat level of 68° in this 79,000 square foot warehouse—and at a fuel cost of only seven-tenths of a cent per square foot for the month.

Recently erected for C. A. Turner Inc., Rankin, Pa., the insulated industrial supply warehouse, with high roof areas and large access doors for truck and rail shipments, is heated by just three 500,000 Btu/hr and one 750,000 Btu/hr gas-fired heaters.

The Dravo "blanket-of-air" method of circulation is particularly effective in large, hard-to-heat areas. Based on high velocity discharge of warm air above the working zone and low velocity return at floor level, this system reduces heat-loss to the roof. Warm air is pulled down to the work area by the return of cool air to the heater. A Dravo heating engineer will be glad to explain the application of this money-saving principle to your particular heating problem.

Bulletin 564, describing the complete line of Dravo *Counterflo* heaters, is available. Write Dravo Corporation, Dravo Building, Pittsburgh 22, Pa.

DRAVO
CORPORATION

Blast furnace blowers • boiler and power plants • bridge sub-structures • cab conditioners • docks and unloaders • dredging • fabricated piping foundations • gantry and floating cranes • gas and oil pumping stations • locks and dams • ore and coal bridges • process equipment • pumphouses and intakes • river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

For more facts circle 513 on Reader Service Card

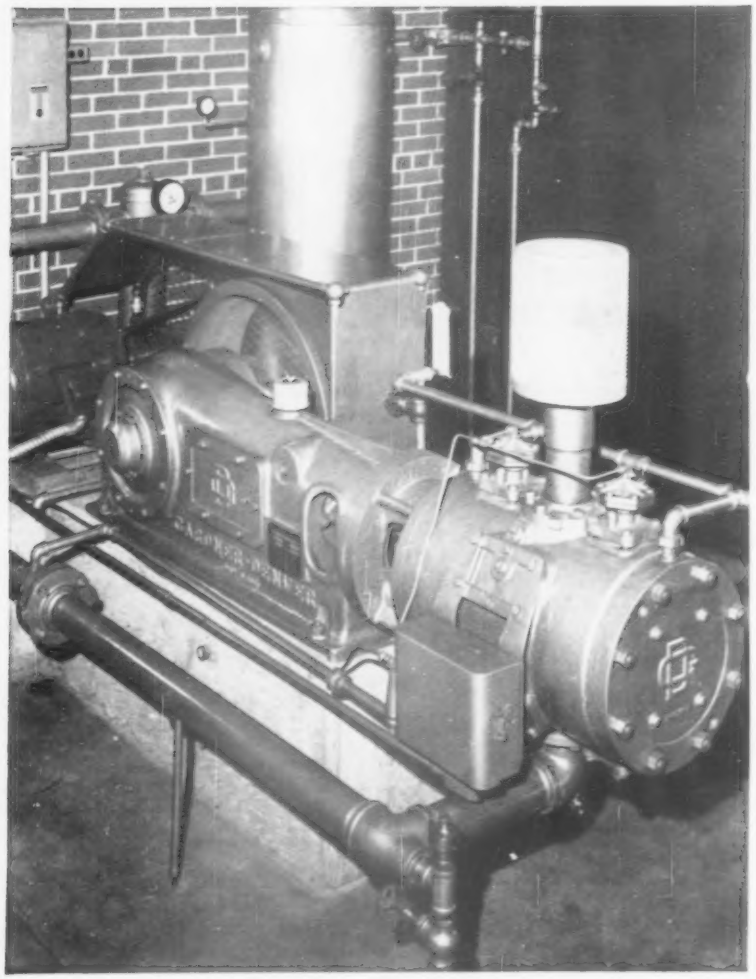
GARDNER DENVER

Pure, oil-free air for processing or instrumentation—that's what you can depend on from the Gardner-Denver CRX compressor. That's because carbon parts in the cylinder—piston, piston rings, packing rings—are made of self-lubricating carbon. No oil or water lubrication is required. Correct cylinder and valve design keeps efficiency high, power cost low. Send for Bulletin CRC-10 today and learn the details.

Stationary air compressors . . . tank-mounted compressor outfits . . . oil-free air compressors . . . whatever your compressed air needs, see your Gardner-Denver compressor specialist first. Gardner-Denver Company, Quincy, Illinois.

Pure, oil-free air

CRX Carbon Piston Compressor



Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

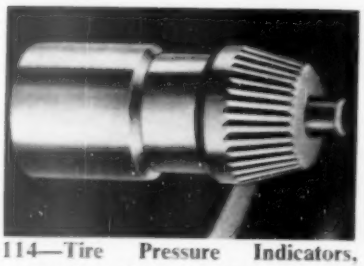
111—Re-usable Cargo Containers of weatherproofed metal can be stored outdoors, stacked in limited space. Double-end doors make loading easy—fork truck can hoist loaded units onto a railroad flatcar. Capacity is 295 cu. ft. or 15,000 lb. *Jeta Metal Fabricators, Inc.*

112—Three-Wheel Fork Truck, gas-powered and pneumatic-tired, is offered in five models, 1500- to 3000-lb. capacities. "Wear-Proof" clutch is guaranteed unconditionally by maker for one year; lubrication requirements are said to be reduced 40%. *Mercury Mfg. Co.*

113—High-Speed Plastic Welder (Model HT hand welder) is fitted with a standard welding tip or a high-speed tacking tip that permits rodless tacking. Can be used with strip feeder to heat-seal vinyl strip on plasticized vinyl tank linings. *Laramy Products Co.*

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



114—Tire Pressure Indicators, screwed on the valve stem of truck tires, measure drops in air pressure and control tire wear. When tip is extended as in photo, pressure is correct. Receded tip indicates low tire. Pre-set for truck tires from 40 to 105 lb. *Frebank Co.*

115—Pneumatic Stretcher is a fast, light, quiet tensional power tool for use on narrow, irregular and round incompressible packages. It's available for every tensional width—3/8-, 1/2-, 5/8-, and 3/4-in. straps—and adjustable to all gages. *Sharon Steel Corp.*

116—Load Lugger Trailer, designed to accommodate steel containers, is loaded by one man with any 4696 or 5810 Series Load Lugger. The all-steel trailer doubles the hauling capacity of the Lugger; has brakes, safety chains, tail lights. *Borg-Warner Corp.*

Turn the page

A swift, safe lift

with non-sparking air hoist

For lifting power that's safe from fire and explosion hazards, use Gardner-Denver air hoists. Non-sparking axial-piston air motor makes these hoists ideal for jobs in chemical, gaseous or dusty atmospheres. Here, a Gardner-Denver two-ton air hoist lifts a mixing vat in a paint manufacturing plant. In addition to this vital safety feature, Gardner-Denver air hoists provide an easily controlled speed for a swift, steady lift—with gentle starts and accurate stops.

Keller air hoists in sizes from 150 lb. to 2 tons. Write for Bulletin 80.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

For more facts circle 515 on Reader Service Card

E

F P

T O Z

L P E D

CHECK YOUR SIGHT NOW!

INSTRUCTIONS FOR USING CHART

Test No. 1: Place chart anywhere from 100 to 1000 feet away from desk. Read third line down.

Test No. 2: Place chart in outer office. Return to your office. Close door and read top line.

Test No. 3: Place chart in production space. Return to your office. Close door and read second line.

...and do something about it!

If you can pass the above eye tests, you don't need Du Mont Industrial Television — but if you're human, and normal, you'll find that Du Mont Industrial Television can give you sight where you can't be. In industry, research and business, there's no substitute for the second sight of Du Mont Industrial Television.

Du Mont offers a complete line of proved, dependable equipment, sold and serviced by competent local contractors from coast-to-coast.

Write for complete details...

DU MONT®

Industrial Television Division,
ALLEN B. DU MONT LABORATORIES, INC.
Clifton, New Jersey, U.S.A.

IT CLOSED CIRCUIT

FACTORY / EQUIPMENT NEWS

Begins on page 128

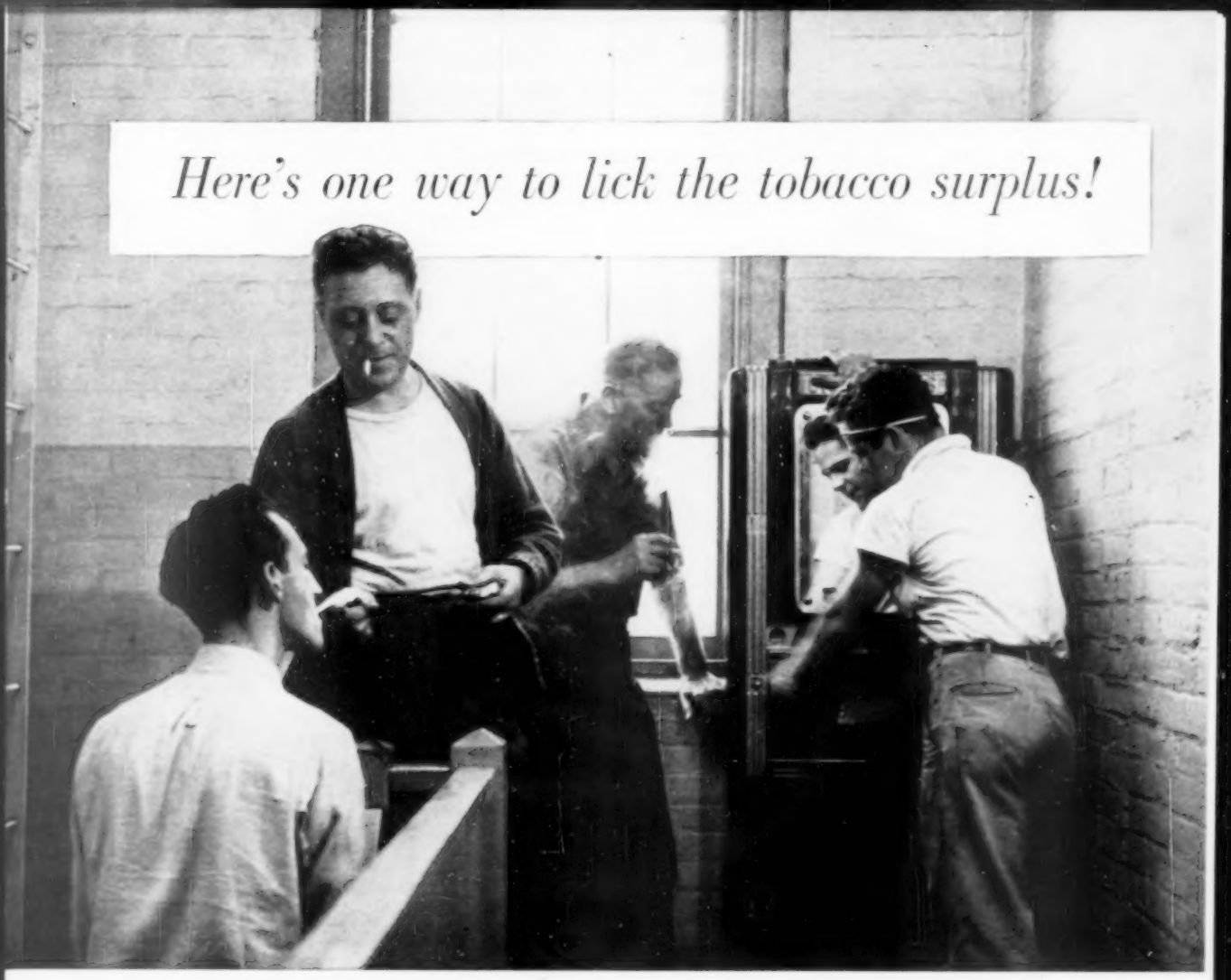
For more about these items, circle item numbers on Reader Service Card next to back cover.

117—Air Circuit Breaker of 1000-mva. interrupting capacity has 35% greater interrupting capacity than next lower rating of its type—but is same height and width. Maintenance on metal-clad cell is simplified by horizontal drawout feature. *Westinghouse Electric Corp.*

118—Sweeper, gasoline-powered and self-propelled, is designed to provide dust-free sweeping at low cost. It creates no dust as it collects dirt, trash, scrap; it's emptied of all débris in seconds. With riding sulky, it turns in 4½-ft. radius. *Parker Sweeper Co.*

119—Stationary Air Compressor is a compact 25-hp. model (25S2) rated for continuous duty at 175 psi. This two-stage, air-cooled, electric-motor-driven unit has 120 cfm. displacement at 175 psi. and 870 rpm. *Le Roi Div., Westinghouse Air Brake Co.*

Turn the page



The only thing operating in Department 3 is the cigarette machine. The men have been standing around since they clocked in this morning. Loafers? By no means. It's just that no work has reached their department.

Yet some other departments have more work than they can handle. Overtime on the one hand, idle time on the other. Think what scheduling like that does to profits!

Management finds out about these things, of course – when it's too late. But with Keysort punched-card controls they need not occur at all. Keysort work-load summaries enable you to schedule production jobs by department *in advance*. Knowing what's ahead, you can transfer men, plan extra shifts or layoffs so that each man-hour pays off fully in work done.

Keysort punched cards – speeded by the new Keysort Data Punch which simultaneously imprints and code-punches production or sales information – offer the simplest, most flexible means of obtaining the fast, accurate, comprehensive reports you need for complete control of your business and profits. Without disrupting present accounting methods. At remarkably low cost.

The nearby Royal McBee man has a presentation which will show you how it's done. Phone him, or write us.

McBEE KEYSORT®

PUNCHED-CARD CONTROLS FOR ANY BUSINESS

ROYAL McBEE Corporation PORT CHESTER, N. Y., Offices in principal cities. In Canada: The McBee Company, Ltd., Toronto 16

For more facts circle 517 on Reader Service Card

NEW BULK PACKING FOR SOUTHERN SCREWS

...designed for you!

DESIGNED FOR MODERN MATERIALS MOVEMENT, FITS ALL PRODUCTION LINES, WHETHER LARGE OR SMALL

Southern Screw's new bulk packing answers your long-time need for a conveniently sized industrial package that can be handled easily by one man without the use of power equipment, yet is ideal for mechanized mass handling with or without palletizing.

Here's how Southern's NEW BULK PACKAGE can save you handling time, production time, storage space and paperwork.

EASIER TO STORE • EASIER TO OPEN and CLOSE • EASIER TO USE • EASIER TO IDENTIFY • HEAVY DUTY CORRUGATED CARTONS • DISPOSABLE PALLETS AT NO EXTRA COST!

Based on the new pallet and carton system, standard packing quantities for each item have been established. For complete information, write for chart BP-1, to Southern Screw Company, Box 1360, Statesville, N. C.

Wood Screws • Stove Bolts • Machine Screws & Nuts • A, B, C & F Tapping Screws • Wood Drive Screws •

Warehouses: New York · Chicago · Dallas · Los Angeles

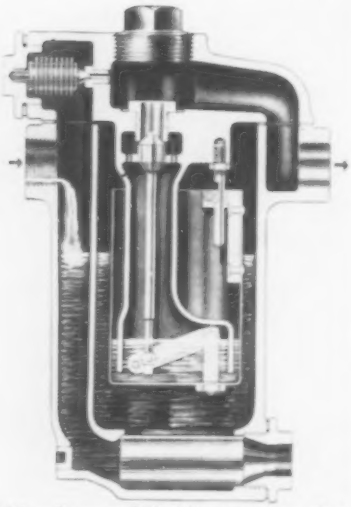
Southern SCREW COMPANY STATESVILLE - NORTH CAROLINA

 circle 518 on Reader Service Card

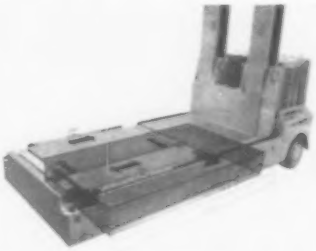
FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



120—Trap "500-C" combines flotation and thermostatic action with built-in strainer. Used for varying pressures 0-150 psig., features fast warm-up and efficient handling of entrainment in every stage from cold start to saturation temperatures. *Wright-Austin Co.*

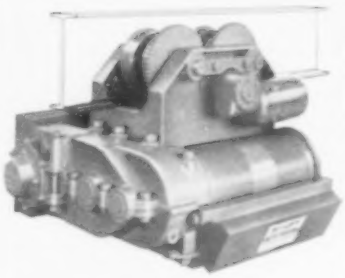


121—Three-Way Die Handler incorporates both end and side loading of 40,000-lb. dies. Hydraulic hooks operate 12 in. beyond end of platform and have 112 in. of travel; hydraulic rams pull dies onto the truck's bed. Power steering. *Automatic Transportation Co.*

122—Thermostatic Mixers for steam and water provide a dependable, economical flow of hot water, set at desired temperature for varied process applications. By mixing steam with hot or cold water they provide water in the 140-200 F. range. *Leonard Valve Co.*

Turn the page

NORTHERN



HEAVY DUTY

HI-LIFT HOISTS

with

TROLLEY DRIVE

Northern Hi-Lift Hoists, in all models from two through 15 tons capacity, with all their heavy duty, rugged features, including the same low headroom, are now available with a new, inexpensive trolley drive designed for moderate speeds, and for single or variable speed control. A worm drive provides smooth, quiet and trouble-free operation. Compact design and arrangement allow maximum approaches with minimum space requirement.

These two-motor hoists are available for A.C. or D.C. current, and are built with standard or fluid coupling drives. Write for further details to:

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

NORTHERN HOISTS

EH-3555

circle 525 on Reader Service Card

Interstate Drop Forge Company—

20 Years a Cities Service Customer and Still Forging Ahead!

The modern way to cut a die is typified by die sinking machine, one of many at Interstate Drop Forge Company. All die sinking machines are lubricated by Cities Service lubricants.

With production running at roughly 1000 tons per month, Interstate Drop Forge Company of Milwaukee is one of the largest forging concerns in the Wisconsin area and growing all the time.

An integral part of this growth story, Cities Service is proud to have filled Interstate's lubrication needs for the past 20 years.

Drop hammers . . . helve hammers . . . upsetters . . . forging rolls . . . shapers . . . automatic metal saws. These are but a few of the diversified machines lubricated by specially tailored Cities Service oils and greases.

Actually, in a plant of this type with so many differing pieces of machinery, it would be possible to have as many as 25 different lubricants. But, Interstate, with the aid of their Cities Service Lubrication Engineer has been able to standardize on twelve Cities Service lubricants.

Streamlining . . . standardizing . . . improving. These are some of the services a Cities Service Lubrication Engineer can render for your operation, too. Ask him to make a free lubrication survey of your plant. Call the nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

For more facts circle 519 on Reader Service Card

Now! Stop Costly Waiting at Tool Crib...use McCaskey Tool Control System!

Now . . . newly developed procedures in McCaskey's famous Tool Crib System . . . completely eliminate time lost by highly paid machine operators drawing and returning tools. Crib attendants prepare kits of tools for jobs or operations in advance. Machine operators simply pick them up or they may be delivered to their machines.

Newly designed tool orders are quickly written by crib personnel, by operators at machines or crib or both. Result: No wasted time at tool crib . . . more working time at machines . . . increased machine productivity.

The McCaskey System reduces tool purchases by cutting crib inventories. Reduces tool breakage, loss and theft. Cuts cost so many ways it pays for itself in a few months.

VICTOR

McCASKEY INDUSTRIAL CONTROLS

Production • Inventory • Tools • Maintenance • Costs

Division of

VICTOR ADDING MACHINE CO.

3900 N. ROCKWELL STREET • CHICAGO 18, ILL.

VICTOR-McCASKEY LIMITED
GALT, ONTARIO, CANADA

Manufacturers of Business Machines
Cash Registers, Business and Industrial Sytems
Electronic Equipment, Electri-Cars

Look for the Victor direct factory branch in the Yellow Pages under adding machines, or mail the coupon.

Find Your Nearest Dealer In The Yellow Pages

Victor Adding Machine Co.
McCASKEY INDUSTRIAL DIV., Dept. FM658
3900 North Rockwell St., Chicago 18, Illinois

☐ Rush complete details about the new features of the McCaskey System.
☐ Send me your free booklet, "How Tool Costs Were Cut 12 Ways in 20 Plants."

Name .....
Position .....
Company .....
Address .....
City ..... Zone ..... State .....

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

123—Conveyor "Boxize" automatically measures and dispenses the right length tape for mixed-size shipping cartons up to 30x23 in. As cartons enter unit, each carton measures its own tape length which is dispensed for application by packer. *Better Packages, Inc.*

124—Automatic Socket Set Screw unit streamlines product assembly work and cuts fastening costs. Attached to a single machine, or used as part of a high-speed line, device can install set screws at pushbutton rates or speeds to 2500/hr. *Standard Pressed Steel Co.*

125—Sleeve-Bearing A-C Motors from ¾- to 15-hp. are designed for quiet operation in air conditioning and pumping applications. Come in all standard enclosures for operation on standard NEMA voltages from 208 to 550 volts. *Reliance Electric and Engineering Co.*

Turn the page

Here's what U.S. Steel Supply Special Services mean to Pitter Metal Products, Inc.

"U.S. Steel Supply Special Services help us CUT PRODUCTION COSTS"

says
W. J. Pitter
President
Pitter Metal Products, Inc.
Maywood, California

• "U. S. Steel Supply pre-cuts sheets to any size we want," says Mr. W. J. Pitter, president, Pitter Metal Products, Inc., sheet metal fabricators, Maywood, California.

"We take advantage of U. S. Steel Supply Special Services by ordering our sheets pre-cut. Thus, we eliminate not only profit-robbing delays caused by cutting the sheets ourselves, but also the risk of costly cutting errors. Our labor costs are reduced, and we have no waste or storage problems with pre-cut sheets. The price differential is *more* than offset by the speed, variety and technical assistance given by U. S. Steel Supply Special Services."

Steel buyers, like W. J. Pitter, know from experience the value of these dependable services.

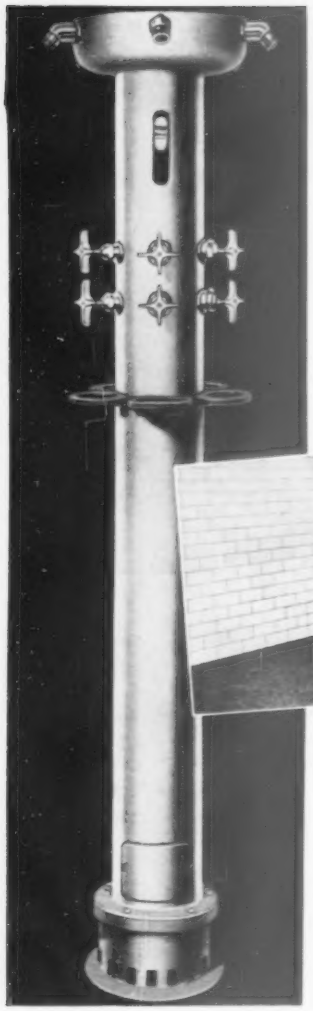
Why not put these Special Services to work for you?

You can use U. S. Steel Supply's flame-cutting, shearing, slitting or coiling equipment, and eliminate the need for this expensive machinery in your plant. If you would like one of our representatives to show you how to benefit from U. S. Steel Supply Special Services, write to U. S. Steel Supply at the address listed below.

U. S. Steel Supply
Division of USS United States Steel

Steel Service Centers Coast to Coast · Mailing Address: P. O. Box 1099, Dept. C6, Chicago 90, Ill. · General Offices: 208 So. La Salle St., Chicago 4, Ill.

For more facts circle 521 on Reader Service Card



Now!

SHOWER BATHS AT LOWER COST

← *One* Bradley Column Can Provide *Five* Showers

Here Bradley Column Showers are placed in partly walled-in room. Where there is a central floor drain, only two piping connections (hot and cold water) are required.

BRADLEY Multi-Person Shower Units

are economical—each Column provides for 5 showers or for 3 (if placed against the wall). The Columns can be installed alone—or provided with partitions and curtains.

Installation time and expense are reduced because each Column can provide the same bathing facilities as five conventional shower stalls. Only *three* piping connections (hot and cold water and drain) are required in place of *15*. If there is a central drain, only hot and cold water connections are required—a further saving.

Bradley Multi-Stall Showers allow each person to control water temperature and volume as desired. They are ultra-sanitary and require a minimum of maintenance work.

For New or Existing Buildings

Bradley Showers can be installed readily in new or existing buildings, economically and in shortest time. For complete details and specifications, please refer to pages 22 to 26 of our Catalog 5601, a copy of which will be mailed on request . . .

BRADLEY WASHFOUNTAIN CO.
2215 W. Michigan Street
Milwaukee 1, Wis.

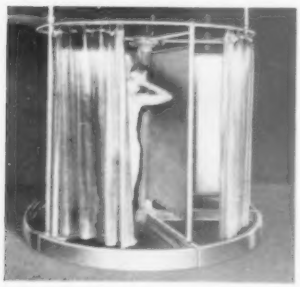
Write for Catalog 5601

BRADLEY multi-person SHOWERS

Distributed Through Plumbing Wholesalers

Some New Users of BRADLEY SHOWERS

Caterpillar Tractor Co., Milwaukee, Wis.
Dept. of Public Works, Detroit, Mich.
Dominion Magnesium Ltd., Haley, Ont.
Hanna Coal Co., Moundville, W. Va.
Kaiser Aluminum & Chemical, Gramercy, La.
Page Hersey Tubes, Ltd., Wheland, Ont.
J. A. Roebling Son Corp., Roebling, N. J.
Scovill Mfg. Co., New Milford, Conn.
Sheffield Steel Nut & Bolt, Kansas City, Mo.
Volunteer Portland Cement, Knoxville, Tenn.
Wheeling Steel Corp., Benwood, W. Va.
W. K. M. Foundry Div. of A.C.F. Industries, Richmond, Texas



5-stall Bradley shower unit with partitions and curtains—Dayton Daily News.

FACTORY / EQUIPMENT NEWS

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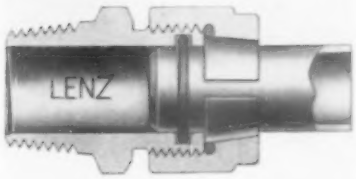
For more about these items, circle item numbers on Reader Service Card next to back cover.



126—O-Ring Fittings, for use on all types of vacuum, air, and hydraulic tubing, come in various types and sizes 1/8 to 2 in. The fitting seals with a standard stock O-ring; initial pressure furnishes sealing force, and higher pressure tightens the seal. *Lenz Co.*

127—Fluorescent Floodlight fixtures to accommodate high-output and Power-Groove lamps are available in 4-, 6-, and 8-ft. lengths. Only one of the special ballasts also available is required for a pair of 4-, 6-, or 8-ft. Fluoroflood fixtures. *General Electric Co.*

128—"Bowl-Type" Parts Feeders come in a wide range of sizes (5- to 36-in. dia.), designed so that user can quickly interchange bowls to handle different parts on the same drive unit. All are available in cast aluminum, stainless, or cold rolled steel. *Syntron Co.*

129—Surface Grinding Machine (No. 510) has plenty of weight for stability (about 1225 lb.) and a one-shot oiling system. Grinds work to 11 in. long, 5¾ in. wide, 12¾ in. high with 8-in.-dia. wheel; work to 12¾ in. high with 7-in. wheel. *Brown & Sharpe Mfg. Co.*

A NEW METHOD FOR WORKING AT HIGH LEVELS SAFELY...

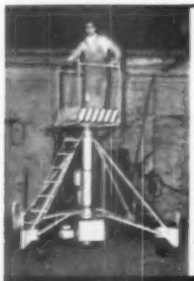
BALLYMORE HYDRAULIC LIFT WORK PLATFORMS

Production and maintenance jobs are made easier, quicker and safer when you use Ballymore Hydraulic Lift Work Platforms. They provide a large, firm working area between 7 and 20 feet from the floor and can be used indoors or out.

Sturdily constructed of steel and mounted on ball-bearing casters . . . can accommodate up to 3 men. Levelizing jacks at each corner assure complete stability.

Hydraulic power raises the formed expanded steel platform to any height up to 15 feet. Double rack and pawl hold the platform at the desired working level.

For complete information, write to the Ballymore Company, West Chester 23, Pa.



MOBILE ACCESS LIFTS . . .

For working levels up to 40 feet above ground level. Easily positioned, quickly elevated, safe. May be collapsed for mobility through restricted openings. Invaluable for a variety of jobs. Write for details.

LOOK FOR THIS LABEL TO BE SURE IT'S THE BEST!

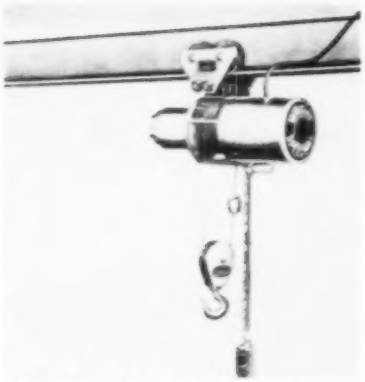
BALLYMORE COMPANY WEST CHESTER, PA

circle 523 on Reader Service Card

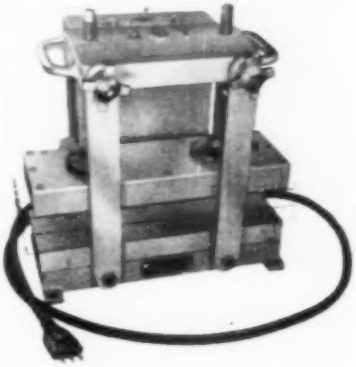
FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



130—Electric Hoists feature a solenoid motor brake and balanced design to prevent undue tipping at either extreme point of lift. Four types: lug suspension, plain trolley, geared trolley, motor-driven trolley. Capacities to 2 tons. *American Chain & Cable Co., Inc.*



131—Vulcanizing Press for repairing electrical cable uses interchangeable aluminum molds to accommodate all standard cable types and sizes. Presses carry a 3000-watt rating; provide up to 25-ton molding pressure and permit Y and T splices. *Joy Mfg. Co.*

132—Worm Gear Speed Reducers with 1/3- to 5-hp. input are offered in 4 basic input-output shaft arrangements—each available in 4 sizes, ratios to 60:1. Units feature a special breather to offset effects of temperature changes. *Foote Bros. Gear & Machine Corp.*

Turn to page 149

New! Multi-Service Grease with Extreme-Pressure qualities

Mobilplex EP

FEWEST POSSIBLE GREASES

- Longer service life
- Extreme-pressure qualities for heavy loads
- Even replaces many high-temperature greases
- Preferred for water resistance

LOWER HANDLING AND DISPENSING COSTS

- No duplication of grease guns and pumps
- Simplifies purchasing
- Easier personnel training
- Less error in application; less storage space

Turn page for additional reasons why

You're Miles Ahead with Mobil

circle 524 on Reader Service Card

Correct Lubrication in Action...

Endicott Johnson saves

Mobil

Complete Engineering Program
Proved Petroleum Products

Mobil

SOCONY MOBIL OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP., MOBIL OVERSEAS OIL CO., INC.

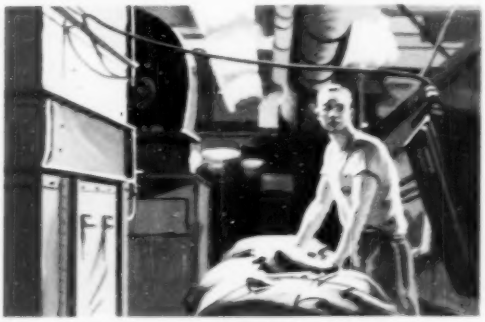
$19,080...with the help of Socony Mobil

Leading shoe manufacturer cuts downtime and maintenance... increases production... all through Mobil's lubrication program!

Endicott Johnson's records offer impressive proof of how a Mobil Program of Correct Lubrication can cut maintenance costs and improve production. Total savings in 1957 alone amounted to $19,080.

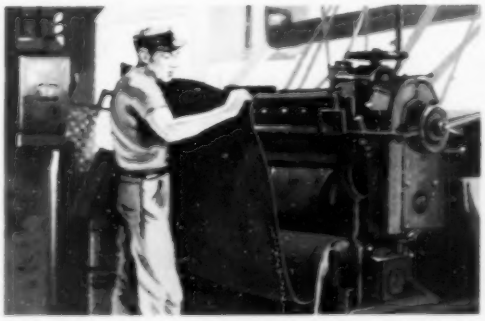
The major share of these savings was made in Endicott Johnson's Upper Leather Processing Plant. Mobil engineers, in close cooperation with plant personnel, analyzed lubricant application methods . . . set up schedules and lubrication records for every machine. As a result, application time was cut 33% . . . a saving of $12,466.

Every phase of Mobil Correct Lubrication is designed to cut maintenance costs. For example, Mobil's in-plant training courses can instruct your personnel in the most up-to-date lubrication methods. Mobil laboratory service can supply invaluable information on oil condition. These services, and many more, are yours when you rely on Mobil. Why accept less for your plant?



Special grease saves $1,075. Six blower breakdowns a year were occurring in ovens used to dry leather. 300°F. temperatures caused bearings to fail. Mobil recommended high temperature grease. Failures ceased, grease consumption was cut 50%.

Mobil specialist avoids costly gear replacement. Mobil gear specialist made a study of all gears in Endicott Johnson's Paracord plant. His recommendation to reverse certain gears to compensate for wear avoided replacement . . . saved a substantial sum.



Mobil sizing ingredient saves $5,039. Mobil representative suggested new ingredient for production of fiber board used in shoe counters. New product permitted use of less rosin in sizing process.

Stuffing wheel failures eliminated . . . $500 saved. Severe operating conditions made it necessary to overhaul one of these huge wheels a year. Mobil recommendation made overhaul unnecessary.

Correct Lubrication

Another reason You're Miles Ahead with Mobil!

Roebling Presents

THE NEWEST CONCEPT IN WIRE ROPE

*Herringbone**

two ropes in one!

Here is a combination that has proved itself during three years of field testing. A welcome addition to Roebling's great line of wire ropes, Royal Blue *Herringbone* is both a regular lay and lang lay wire rope!

So, in one rope you have the greater flexibility and abrasion resistance of lang lay construction *plus* regular lay's superior stability under severe operating conditions.

Preformed Herringbone is made of two *pairs* of lang lay strands, and two strands of regular lay which separate the two pairs of lang lay—all of it made of Type 1105 rope wire.

For three years Herringbone has been used for general hoisting, holding and closing lines, shovel ropes, wagon scraper ropes and dragline ropes. Without reservation, its performance has been superior to that of any other rope used for the same jobs . . . even in the hands of inexperienced personnel! *Its proven capabilities clearly suggest its use for all jobs where steel core ropes are normally used.*

See your Roebling salesman for all the facts or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey. Roebling Herringbone, the two-in-one rope to meet the *doubly* stringent demands of today's economy.

ROEBLING

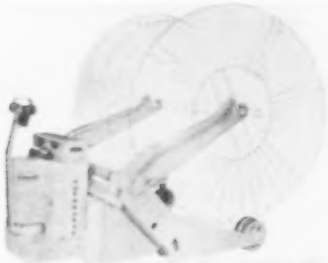
Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

**Reg. app. for*

HERRINGBONE
WIRE ROPE

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



133—Cable Reel Handler with adjustable pivoted lifting arms can handle reels 36 to 46 in. wide and up to 90-in. dia. Simultaneous movement of the load arms is assured by connecting telescoping torque tube. Lifting capacity to 15,000 lb. *Automatic Transportation Co.*

134—Dual-Capacity Lift Truck has a standard capacity of 2000 lb. at 48-in. load length. By adding a quickly removable counterweight to this electric truck's rear, capacity is immediately doubled to 4000 lb. at 48-in. load length. *Lewis-Shepard Products, Inc.*

135—"Payloader" Model H-25 is a rubber-tired, front-end loader with a rated carrying capacity of 2500 lb. It can be operated in and out of boxcars having 6-ft. doors; maximum dumping height clearance is 5 ft., 4½ in. Gasoline, diesel, LPG models. *Frank G. Hough Co.*

Turn the page

New **WIDER** Structoglas panels save labor, waste and money

Don't buy *any* fiber glass panels until you get a quote on new *wider* Structoglas corrugated. Two new widths (51½" for skylights, 50" for glazing, both covering 48") give you more installed coverage area per dollar than any other panel. Wider Structoglas has fewer overlaps, needs less fasteners, takes less time to install. You actually save 10c per square foot when you install 51½" Structoglas instead of ordinary 27½" panels.

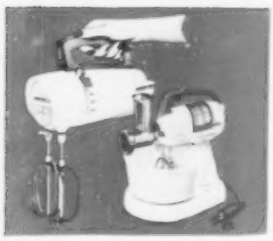
Specify Structoglas—the reinforced plastic panels that eliminate glass breakage, transmit diffused natural light.

structoglas

Write for specs and prices to
STRUCTOGLAS DIVISION
International Molded Plastics, Inc.
Dept. F6, Cleveland 9, Ohio

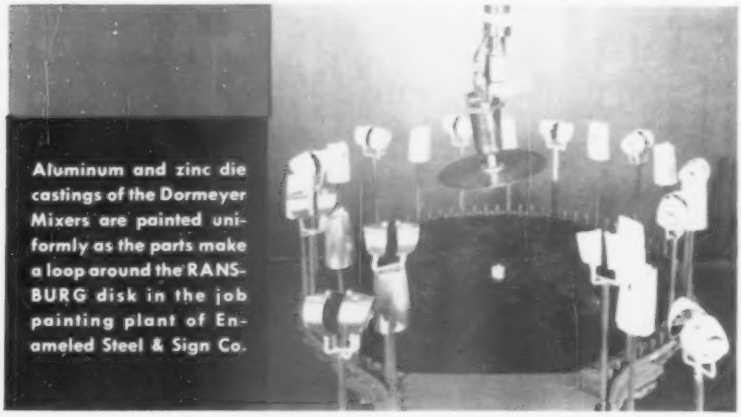
5509

For more facts circle 527 on Reader Service Card



DORMEYER MIXERS are painted with RANSBURG NO. 2 PROCESS

. . . and high quality standards are easily maintained with Electrostatic Spray Painting



Aluminum and zinc die castings of the Dormeyer Mixers are painted uniformly as the parts make a loop around the RANSBURG disk in the job painting plant of Enameled Steel & Sign Co.

● Enameled Steel & Sign Co. is able to serve many customers like Dormeyer, for their Chicago job painting plant is equipped with modern and efficient finishing facilities for producing high quality, high volume painting.

Electrostatic spray painting has practically replaced all other methods here, for the flexibility and near 100% efficiency of the Ransburg No. 2 Process enables Enameled Steel to serve many manufacturers of a wide variety of products. And, this with a comparatively small labor crew!

Today—with Ransburg No. 2 Process—Enameled Steel is realizing more than 60% paint savings over former hand spray. Rejects have been cut to less than 1%, for the Ransburg No. 2 Process applies a uniform, high quality finish never before obtainable with old-fashioned painting methods.

THINK OF WHAT 60% PAINT SAVINGS WOULD MEAN IN YOUR OWN FINISHING DEPARTMENT

Whatever you manufacture, if your production justifies conveyorized painting, you should look into the savings and improved quality which can be yours with Ransburg Electro-Spray. Let us tell you about the complete Ransburg services, including the test painting of your products in our laboratories.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

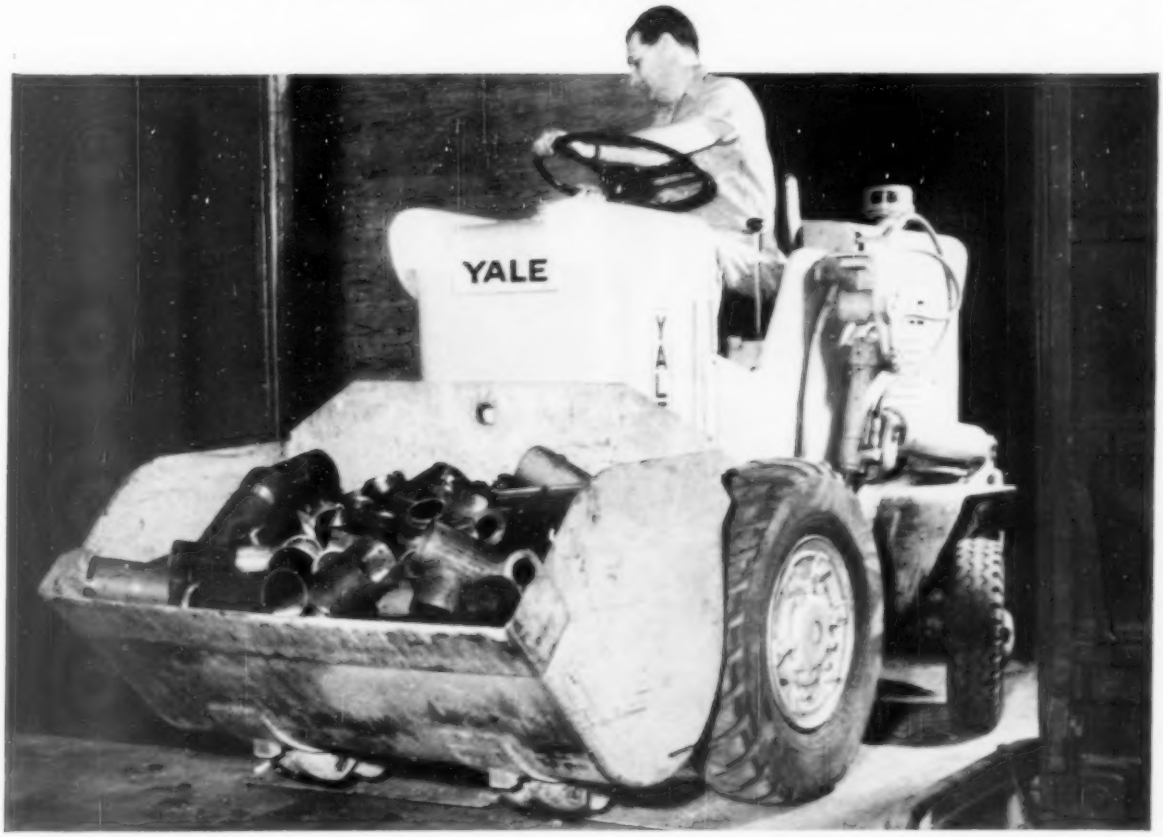
136—Portable Magnetic Drill press with automatic power feed speeds hole-drilling on production jobs—drills holes to 1¾ in. while in any position. One man can operate 3 machines at once; special adapter accommodates any make or size portable drill. *Buck Mfg. Co.*

137—Walkie Platform Truck for handling heavy skid loads (to 2 tons) has a compact power unit only 20½ in. longer than load lengths (uses four 6-volt batteries, two mounted on each side of drive unit). Platform lengths to 72 in., widths to 30 in. *The Raymond Corp.*

138—Roof-Hugging Ventilators give a low-line silhouette to plant buildings with large, open interior areas. Included in line are hooded and vertical, exhaust and supply, direct and belt-driven units to handle a wide variety of ventilation jobs. *The Trane Co.*

Turn the page

NEW YALE INDUSTRIAL TRACTOR SHOVEL



Carries more tonnage every hour

—field tests prove it!

Actual field tests prove the amazing work-capacity of the new Yale Industrial Tractor Shovel. Extra tonnage—extra work—extra duty cycles! Operating acceleration speed is 8 mph in 3.5 seconds. And Yale's exclusive fully automatic Torque Transmission produces quicker, smoother starting, more power under load conditions.

Loader-linkage advantages are unique. Exclusive 45° ground-level tipback provides top loading action, minimum spillage in grade-level position. Exclusive 6' dumping clearance (highest on any model of similar wheelbase) automatically returns bucket from full dump position to dig position.

Let your operator work with it. He'll like the roomy, clear cockpit—the finger-tip controls—the ease of handling—the fact that there are no gears to shift. He'll especially like Yale's exclusive Safety-Curve Arms—that never rise above the side frame to cause injury. For a demonstration in your plant or further data write The Yale & Towne Manufacturing Co., Philadelphia, Pa., Dept. A-36.

COMPARE THESE YALE FEATURES:

- Exclusive Yale Torque Transmission (fully automatic)
- Exclusive 45° ground-level bucket tipback
- Exclusive 6' dumping clearance
- Exclusive Safety-Curve Arms
- Exclusive acceleration speed to 8 mph. in 3.5 sec.
- Exclusive sealed brakes
- Exclusive forward and rear operating lights
- 2500 lbs. carrying capacity
- Short wheelbase for minimum turning radius
- Gasoline or LP-Gas powered

YALE* REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS & TRACTOR SHOVELS • HOISTS

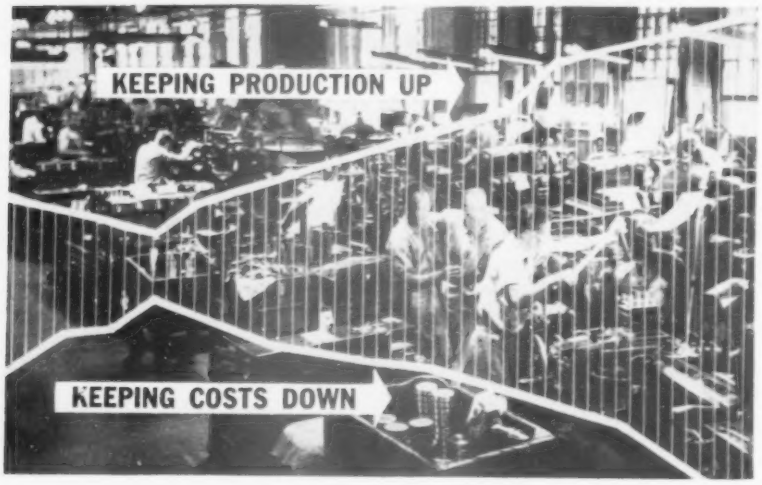
YALE & TOWNE

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • INDUSTRIAL TRACTOR SHOVELS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

For more facts circle 529 on Reader Service Card

If you want to do something about . . .



PUT AJAX TO WORK FOR YOU

ABSENTEEISM can be a bugaboo to the men responsible for production — all along the line. It upsets schedules, boosts costs — cuts profits. AJAX *complete* drinking water service helps in three ways to reduce absenteeism, keep work profitably on schedule.

Safety messages — imprinted free on AJAX (or AERO) Cups do help reduce lost-time accidents by constant reminder of the routine precautions we are all so prone to neglect.

Clean, crisp AJAX Cups — the most sanitary way to provide drinking water — reduce hazard of contagions like the common cold that cost industry 300,000,000 lost man-hours per year.

Comfort and convenience of AJAX Cups encourages adequate water intake — vital to peak efficiency — boosts worker morale, is actually the most time-saving way of providing clean drinking water.

Why don't you take advantage of the three-way protection offered by AJAX *complete* drinking water service?

AJAX® CUPS — one-piece wedge shaped, easy to hold and drink from; 4, 6 and 7 oz. sizes; packed imprinted with assorted stock safety messages at no extra cost or your own message to order.

AERO® CUPS — for those who prefer a flat-bottom cup; in 3, 4, 5 and 6 oz. sizes. Also with stock safety messages or your own message to order.

GET THE FULL STORY — ask your industrial supply house or paper merchant for full details about AJAX and AERO Cups and equipment. Or write to

United States Envelope Company

General Offices: Springfield 2, Massachusetts

15 Divisions from Coast to Coast

For more facts circle 530 on Reader Service Card

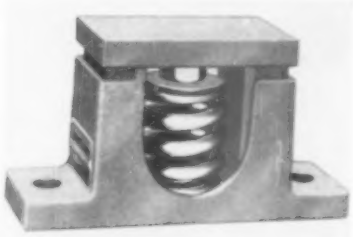
FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

139—"Heat Eye" multi-frequency radiation pyrometer provides accurate control of fast-moving heat-processed materials such as textiles and paper. Comes with a specially calibrated potentiometer recorder-controller as a plug-in package unit. *Velotron, Inc.*

140—Electronic Parts Counter permits accurate batch counting of small parts like machine screws and rivets, at rates up to 1000/sec. Unit will count any item passed through a beam of light. It's quickly serviced by non-technical personnel. *Electronic Engineering Co.*



141—Spring Mounting for machinery is available in load-carrying capacities ranging from 150 to 23,000 lb. Steel springs are the "cushioning" medium. Mount's smooth top permits placing it in any position under machine base for firm support. *Korfund Co., Inc.*

142—Swench is a rugged, hand-operated wrench capable of delivering all the power a 1-in. square drive can withstand. Using tool with its extension handle (over-all length: 26½ in.), one man can easily tighten or loosen bolts up to 1¾-in. dia. *Swenson Engineering.*

Turn to page 158

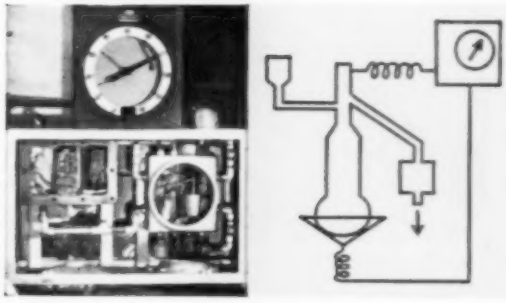
Nothing gets by

Automatic end-point testing device developed by Standard Oil research men makes certain of the uniform quality of gasoline and diesel fuel delivered to you.

Scientists at Standard Oil never stop in their drive to improve and then improve again the uniform quality of the petroleum products that bear the Standard Oil trade-mark. These engineering research scientists have now created wholly new instruments for performing near continuous physical analysis *automatically*.

One such instrument automatically performs the physical analysis that determines end-point. Using it, refineries maintain a continuous inspection of the temperature at which gasoline and diesel fuels are completely distilled. To you, this means that Standard is able to maintain a constant control over the uniformity and high quality of (1) the fuels you burn for heat or use to power your diesel engines and (2) the gasoline for your truck and passenger car fleets. It also means that Standard Oil power- and heat-producing petroleum products, with their constantly controlled end-point, burn uniformly, give you uniform high performance.

This is part of the research pay-out, the "something more" research builds into the products you buy from Standard. This is your return from Standard's investment in research. And now there are 48 district offices in the 15 Midwest and Rocky Mountain states to serve you. Call the one nearest you. **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**



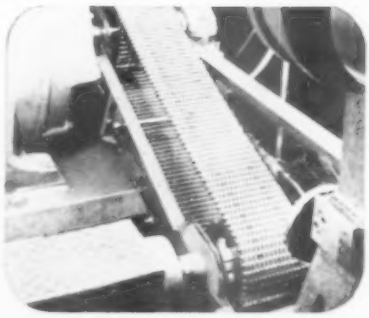
Automatic end-point tester works this way. A small sample is placed in an electrically heated flask. The temperature is measured and recorded during a heating cycle when distillation is accomplished. Distillate is condensed and drained, the flask temperature is lowered by introduction of the next sample, and the apparatus is ready for another test.

You expect more from STANDARD and get it!

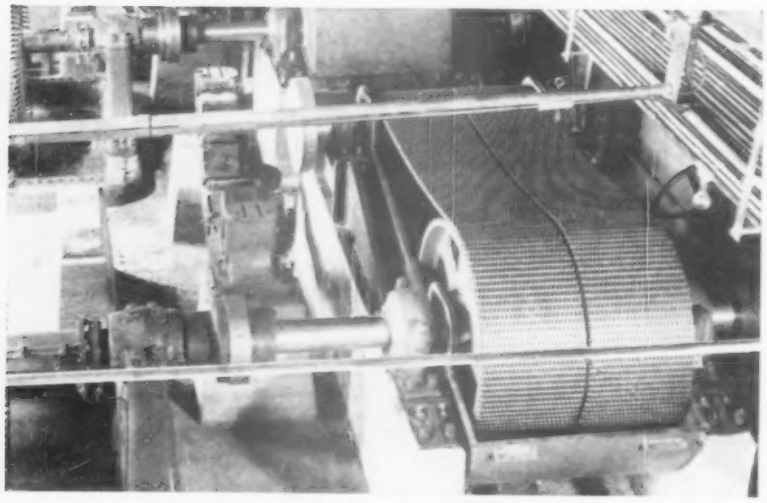
For more facts circle 531 on Reader Service Card

How LINK-BELT silent chain comes through industry's stiffest tests

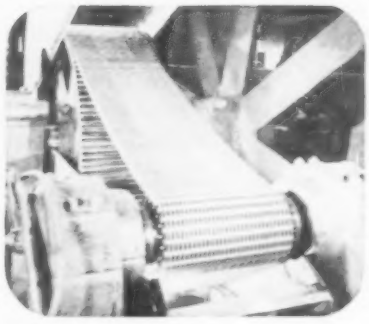
No other drive can do the same



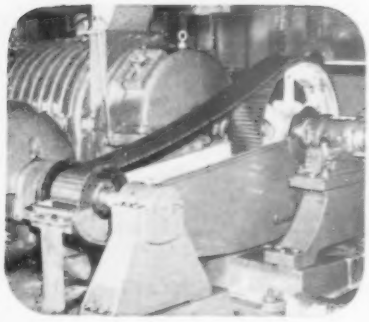
HIGH SPEED. Link-Belt silent chain drives on newspaper presses often operate at speeds of 4000 to 5000 feet per minute.



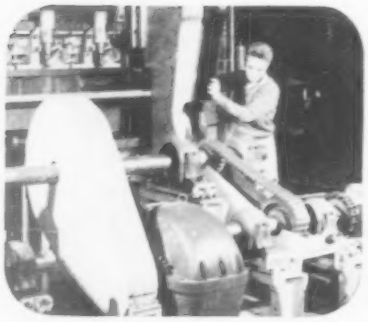
LARGE OR SMALL HP. Two 24-in. strands of Link-Belt silent chain on turbines powering 850-kw generators comprise one of the largest chain drives ever built. Silent chain provides high efficiency over (98%) on large or fractional hp drives.



ADVERSE OPERATING CONDITIONS. Effects of heat, humidity and cold are minimized with Link-Belt silent chain drives.



LARGE RATIOS. Link-Belt silent chain operates efficiently at ratios as high as 10-to-1, with resulting space economies.



LIMITED SPACE. Easy to assemble in close quarters. Link-Belt silent chain permits built-in drives, compact housings.

LONG LIFE. Link-Belt silent chain has given more than 30 years of uninterrupted service on ventilating systems.

Ask your Link-Belt office or authorized stock-carrying distributor for

88-page Book 2425

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,600

For more facts circle 532 on Reader Service Card

Are You Preparing *Now* For The Next Boom?

America's leading companies are not sitting on their hands waiting for the recession to end. They are planning ahead ***now*** for higher sales and near-capacity rates of operation.

These facts stand out clearly from the eleventh annual survey of Business' Plans for New Plants and Equipment just completed by the McGraw-Hill Department of Economics:

- **Manufacturing companies expect their sales to increase 20%, on the average, from 1958 to 1961.** Growth industries, such as chemicals and electrical machinery, expect gains of 25% to 34%.
- **If these sales gains are achieved, the average rate of operations in manufacturing will rise from 78% at the end of 1957 to almost 85% by 1961.** This is the point at which pressure on costs begins to mount, as less efficient facilities are pressed into service.
- **Industry is not waiting for this point to begin getting its plants and equipment in shape for the next boom.** Despite record expansion in the past several years, many manufacturing companies plan to add new capacity in each of the next four years. But, more important, they are going ahead with the vital job of modernization and cost-cutting.

In the years immediately ahead almost two-thirds of capital investment will go for modernization and replacement of present plants and equipment. In this way manufacturing companies can avoid the higher costs and the squeeze on profits that occur when producing facilities are not in shape to handle an increase in sales volume.

These are the plans, as reported to McGraw-Hill, of a wide sample of manufacturing companies—for the most part, large firms and leaders in their respective industries. Altogether, these firms account for almost 40% of all employment in manufacturing industries.

Now Is The Time

How do your plans measure up? Are you planning ahead now for a 20% sales increase in the next three years? Is your company planning to modernize its buildings and equipment more rapidly than at any time in the recent past? If not, here are some of the inducements

that McGraw-Hill editors report from their continuous checking on the state of business.

(1) **There are plenty of opportunities for increasing efficiency by the installation of new equipment and the improvement of layouts in plants, warehouses and offices.** Despite the installation of tremendous volumes of metalworking equipment in recent years, according to AMERICAN MACHINIST over half of the machine tools now in U. S. factories are over 10 years old. Replacement of worn-out and obsolete equipment will mean material savings in operating and maintenance costs.

(2) **Machinery, parts, materials and labor are much more readily available now than they are when the economy is running at full steam.** You can be more particular about quality and about specification to meet your own requirements.

(3) **With lower interest rates and less competition for loans, it is both easier and cheaper to borrow money to finance equipment and construction.** To wait for another boom is to run the risk of having to pay higher interest rates and look harder for money.

(4) **Although there is an adequate supply of most types of labor available now, the prospect is that the supply of factory labor over the years ahead will be tight.** In 1965, there will actually be fewer men and women between the ages of 25 and 44 than there are now. Good factory workers will be either hard to get, or wage rates will rise sharply or—more likely—both. The best answer is to anticipate the rise in labor costs by installing more efficient equipment to increase labor productivity.

(5) **Finally, the costs of investing in new buildings and improved equipment *now* are almost surely less than they will be later.**

These are some of the reasons why many leading firms find ***now*** the best time in years to start on a program of plant modernization. There are other good reasons in the many new products and processes coming from the boom in research and development. This year industry will spend over $8 billion on R & D—$1 billion more than in 1957. And a heavy share of the new product development will consist of better machines and processes to be made available during the next few years. Already the pace of technical advance is so rapid as to call for modernization of plants built only a few years ago.

Years of Opportunity

It has been said that the years between now and 1961 are the "middle years" between two booms. This does not mean a long period of recession, but a period of slower growth—a transition from the postwar boom based on deferred demand, to a new boom in the 1960s based on dynamic population growth and a revolution in technology.

If so, these are the years of opportunity for business—opportunity to prepare for the growth that lies ahead with the most efficient equipment, the most modern plant and the best production organization that can be devised. This is the way to fight higher costs and avert a resumption of inflation. This is also the way to ensure that your company will be ready for its new markets in the 1960s.

Are you planning ahead ***now*** to be among the leaders?

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C McGraw
PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

WORK SAFELY IN HAZARDOUS AREAS ...CUT INSURANCE COSTS

With Underwriters' Laboratories-Inspected

Allis-Chalmers GS Lift Trucks

Underwriters' Laboratories, Inc.
INSPECTED
POWER-OPERATED
INDUSTRIAL TRUCK
ALLIS-CHALMERS MFG. CO.
MILWAUKEE 1, WIS.
TYPE GS No. 0000

Allis-Chalmers GS-approved lift trucks are *safe*. They are Underwriters' Laboratories-inspected and can work safely in areas described at the left.

This safety means more than protection of men and property. It means lower insurance rates — it also means extending material handling economies to new areas.

Users say Allis-Chalmers lift trucks are the most productive and efficient they ever used. Their heavy-duty industrial engines deliver more usable power, do extra work every hour, stay on the job longer.

Allis-Chalmers GS (gasoline safety) lift trucks are available in capacities from 3,000 lb to 10,000 lb. Diesel, DS-approved safety trucks also are available in several sizes. Ask your dealer to show you how these trucks can contribute to the economy of your operation, or write for literature.

ALLIS-CHALMERS ENGINE - MATERIAL HANDLING DIVISION, MILWAUKEE 1, WISCONSIN

Here's where you can use UL-inspected Allis-Chalmers GS and DS industrial trucks... and fully satisfy insurance requirements.

CLASS I, DIVISION II
Group D, Part b

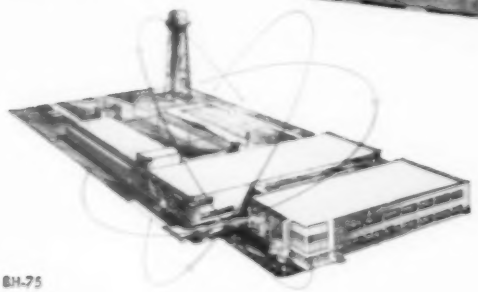
Atmospheres where volatile flammable liquids and their vapors or flammable gases are normally confined — gasoline, naphtha, alcohol, acetone and lacquer.

CLASS II, DIVISION II
Group G, Part b

Locations where combustible dusts are present but not normally in suspension in the atmosphere—coke dust, metal dust and carbon black.

CLASS III, DIVISION II

Locations where ignitible fibers are stored—cotton, jute, Spanish moss, excelsior and baled waste oakum.



To keep Allis-Chalmers design YEARS AHEAD . . .
this new multi-million-dollar lift truck and engine development and engineering center has been built — including a proving ground for material handling equipment.

ALLIS-CHALMERS

BH-75

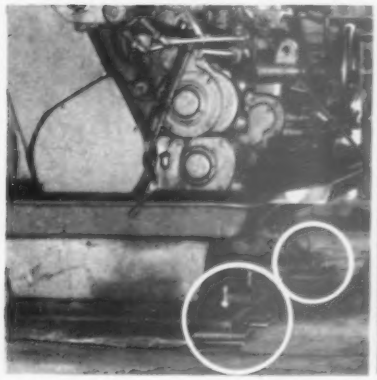
For more facts circle 533 on Reader Service Card

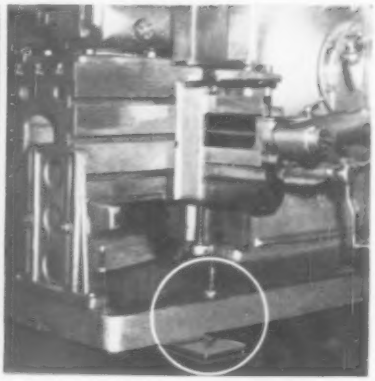
NEWS ABOUT MACHINE MOUNTS

"UNISORB LEVEL-RITES CUT MACHINE MOUNTING TIME BY 75%!"

SAYS DAKE CORPORATION

New Unisorb Level-Rite Mounts are providing vital money-saving benefits for plants. Dake Corporation — moving machine tools into their new Grand Haven, Michigan plant — found they saved approximately 75% in mounting time. Plus . . . machines have less vibration, are quieter, can be quickly and easily leveled at any time and are always ready for relocation.





Get these savings for your plant! Try Unisorb on special Trial Offer — if not satisfied your money will be refunded. Write or call today.

UNISORB 206 SOUTH ST. BOSTON 11, MASS.

Division of The FELTERS Company

Want more information? Send for set of Unisorb "Facts" Books!

Please send me a set of Unisorb "Facts" Books and trial offer request.

Company .....

Name .....

Address .....

City ..... Zone ..... State .....

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

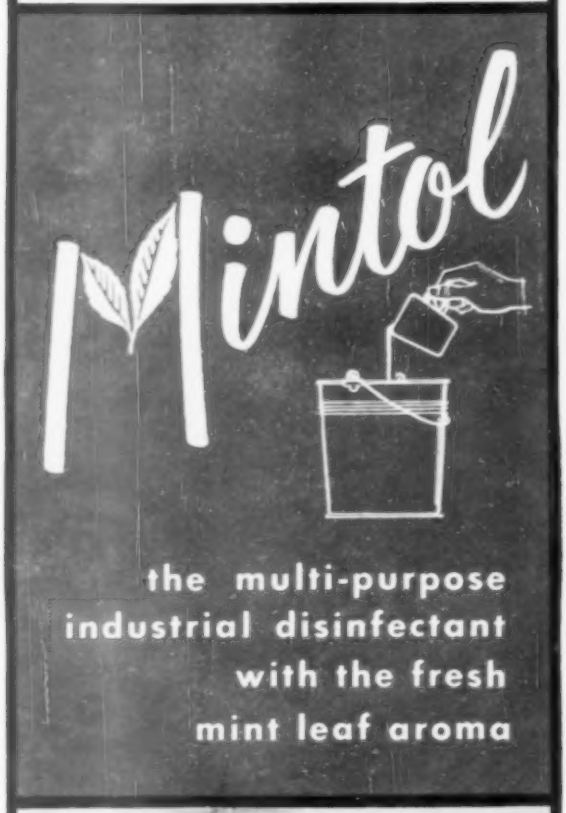
143—Magnetic Stirrer solves problem of agitating highly corrosive liquids. The corrosion-proof, Teflon-encapsulated magnet is placed in vessel with liquid and rotated by standard magnetic stirrer under the container at the required speed. *U. S. Gasket Co.*

144—Variable Transformer in rugged dust-tight enclosure offers wide mounting flexibility, easy access for service. Single units and ganged assemblies available for 120-, 240-, 480-bolt, single and 3-phase service, with loads up to 5.2 kva. *Superior Electric Co.*

145—Sand Separator of two-chamber design removes sand and silt from water with removal efficiencies close to 100%. Standard models cover a wide range of pressures and capacities for use by food processing, chemical, and other industries. *Walter R. Cole & Co.*

Turn the page

Leaves air mint fresh!



the multi-purpose industrial disinfectant with the fresh mint leaf aroma

MINTOL disinfectant has a coefficient of 9. Diluted half a cup to the pail of water, it meets the new Use Dilution Confirmatory Test.

Kills bacteria. Mintol sanitizes the surface. Just dilute and apply with mop. Instead of a druggy odor you'll get that refreshingly modern mint fragrance.

Deodorizes. Add one-quarter cup of Mintol to your favorite cleaning solution and apply with mop. You will deodorize as you clean—do both jobs with the same swish of the mop.

For literature about MINTOL and other Dolge products write to The C. B. Dolge Company, Westport, Conn.

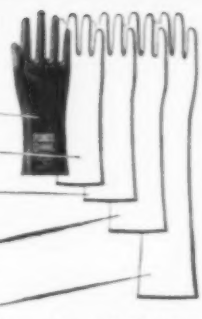
For free sanitary survey of your premises ask your Dolge service man

dependable DOLGE
WESTPORT, CONNECTICUT

These Stanzoil® Milled Neoprene Gloves Guarantee Positive Liquidproof Protection in 103 Basic Oils, Acids, Caustics, Greases, Solvents

Black All Neoprene Stanzoils With Non-slip Grip

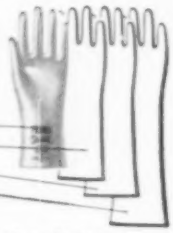
Model	Weight	Fingers	Length
N-31	Light	Straight	10½"
N-35	Light	Curved	10½"
N-32	Medium	Straight	11"
N-36	Medium	Curved	11"
N-41	Heavy	Straight	12"
N-44	Heavy	Curved	12"
N-51	Heavy	Straight	14"
N-33	Light	Straight	14"
N-54	Heavy	Curved	14"
N-71	Heavy	Straight	18"
N-73	Light	Straight	18"
N-74	Heavy	Curved	18"



White All Neoprene Stanzoils With Smooth Finish

Model	Weight	Fingers	Length
N-30	Light	Curved*	10½"
NW-31	Light	Straight	10½"
NW-32	Medium	Straight	11"
NW-41	Heavy	Straight	12"
NW-51	Heavy	Straight	14"

*Non-slip



FREE Hand Protection Analysis . . . Send a description of your job requirements (length, dexterity, wear resistance, chemicals used, importance of safe grip, hot or cold temperature extremes, fatigue factor and sizes) to our "Hand Protection Clinic." New catalog and price list available on request.

the PIONEER Rubber Company
293 Tiffin Road, Willard, Ohio

For more facts circle 535 on Reader Service Card

For more facts circle 536 on Reader Service Card

"Aisle-designed" Tennant "80" sweeps efficiently; cleans aisles up to 8½' wide in one round trip

How many dollars will this SWEEPER save you daily?

In a medium-sized Cleveland plant, the "80" Power Sweeper saved $21 a day in labor costs alone. *That's $5,460 yearly!*

The exact saving you can expect in your plant depends on factors such as area to be swept, obstructions, and present labor costs.

Time studies show the TENNANT "80" replaces 3 to 15 men with push-brooms. It can sweep over 100,000 sq. ft. an hour in open areas. Under typical conditions, it's not unusual for the "80" to pay for itself in a year's time.

Provides clean, dust-free pickup. With its powerful brush-and-vacuum system, the "80" picks up litter that would be missed with hand sweeping. It easily lifts dirt from cracks; handles heavy, bulky debris as readily as light material. Sweeps 42" to 53" path.

Starts, stops, reverses instantly without shifting gears. Dirt hopper holds up to 800 lbs. Dumps hydraulically.

For more information, write G. H. Tennant Company, 705G N. Lilac Drive, Minneapolis 22, Minnesota. You'll be under no obligation.

TENNANT

Industry's Most Widely Used
POWER SWEEPERS

Model 40 Walk-behind Sweeper

Gasoline-powered Model 50 Sweeper

Model 36 Electric Sweeper

SPECIALIZED MAINTENANCE EQUIPMENT

POWER SWEEPERS • FLOOR MACHINES • SCARIFIERS • ROOF SCRAPERS • CONCRETE ROUTERS

For more facts circle 537 on Reader Service Card

FACTORY / EQUIPMENT NEWS

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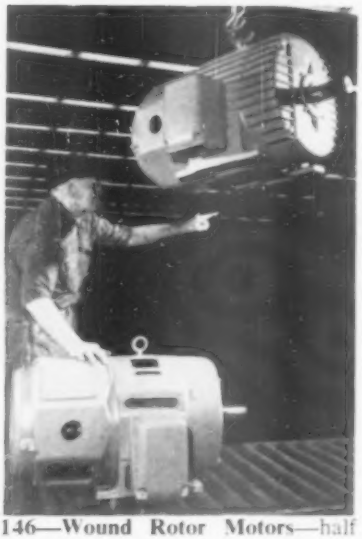
For more about these items, circle item numbers on Reader Service Card next to back cover.



146—Wound Rotor Motors—half the size and weight of previous models—are available from 5 to 150 hp. Two types: Type MR is intermittent rated for crane and hoist operation; M, rated for constant or adjustable speed on fans, compressors. *General Electric Co.*

147—Detachable Power Cord assortment provides all the tools and components for converting any electrical device to detachable power input—with cords up to 30 ft. long, both 2- and 3-wire—in just 5 to 10 minutes. Price complete is $395. *Alden Products Co.*

Turn the page

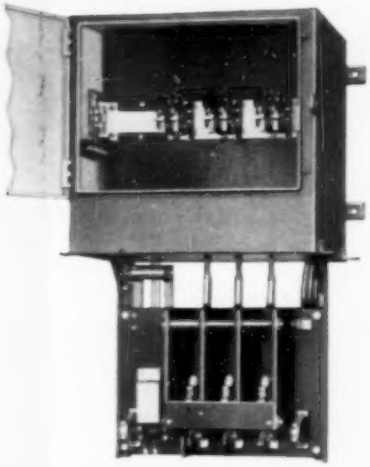
Designed

Specifically for 2300-volt Motors—

NEW EC&M type LZH STARTER

This new starter is compact, lower in cost than EC&M's Type ZHS high capacity oil-break starters, and is especially designed for use where short circuit requirements are small or where high interrupting protection is provided by other means.

You Get these BIG features— at Low Initial Cost



- Wide application—up to 350 HP at 2300 volts. Interrupting capacity 10x full load motor current.
- Self-contained Control Transformer with fused secondary for 220-volt pushbutton operation.
- Type ZTM thermal-magnetic overload relays give inverse time and instantaneous trip protection.
- Heavy-duty Type LZH magnetic contactor.
- Wall-mounted with drop oil tank. Anti-syphon leads between tank and upper compartment.
- Control leads brought to terminal board. Incoming and outgoing cables equipped with solderless power lugs.
- High and low voltage separated by insulating barrier.

***Write* for Bulletin 8121**

EC&M Class 8130 Starters up to 2500 HP, 4800 Volts—available in 3 styles: *(1)* 50,000 KVA *(2)* Power Fused and *(3)* VALIMITOR (unlimited protection without fuses)

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

1237

For more facts circle 538 on Reader Service Card

Palleted Nestiers keep parts handy

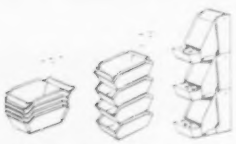
CUT PARTS-HANDLING COSTS AS MUCH AS 60% WITH **NESTIER**

BOXES AND BASKETS

Hundreds of manufacturers are stepping up production with these economical steel containers. Nestier Boxes and Baskets eliminate rehandling of parts in the work area. Filled in the stockroom, they tier in rigid stacks on pallets, conveyors or moving belts. Twin handles permit easy lifting or hanging from overhead conveyors. Parts can travel through all production operations including dipping or degreasing in perforated Nestier Baskets. Both Boxes and Baskets can be stacked alongside of workers or hung in hopper racks to provide convenient supplies of parts in a compact area. Empty, they nest neatly out of the way. Uniform construction permits you to take inventory by batch-weighing the contents. Nestier Boxes and Baskets are available in five sizes, 12" to 36" in length. For further information, fill in and mail this coupon today.

NESTIER®
FIRST IN SMALL PARTS HANDLING

NESTIER CORPORATION
Subsidiary of THE METAL SPECIALTY CO.



THEY NEST • THEY TIER • THEY RACK

Nestier Corporation
4519 Este Ave., Cincinnati 32, Ohio
A-6

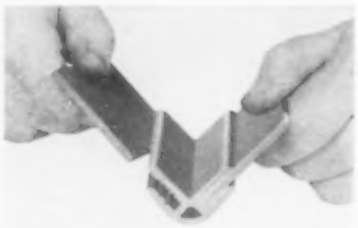
Please send me further information on Nestier Boxes and Baskets.

Name _____ Title _____
Company _____
Address _____
City _____ Zone ____ State _____

FACTORY / EQUIPMENT NEWS

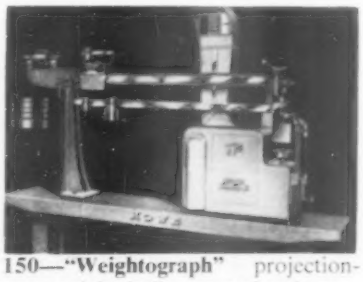
Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



148—PVC Joining Strips, applied with solvent welding instead of hot air welding, cut assembly time for fabrication of PVC tanks and ducts. Shown is 90-deg. joining strip for making corners; PVC sheet at right is held in strip by solvent. *Colonial Plastics Mfg. Co.*

149—Pulsair Cleaning Gun incorporates unbalanced pressure valves that accelerate the velocity of compressed air flow about 20 times the force at source. Useful, with varied attachments, for cleaning boilers and machinery, sand blasting, etc. *L. C. Nesham Co.*



150—"Weightograph" projection-type weight indicator makes it possible to read accurately weight indications many feet away from the scale. Actual weight is projected on large illuminated screen in eye-level periscope housing. Several models. *The Howe Scale Co.*

Turn the page

Weeds are a hazard you can't afford!

Spray them away with GARLON—the new weed and grass killer

These men have taken a step in the right direction. They're planning an application of the new Dow weed and grass killer, GARLON*, to put out weed-caused fires before they start, to prevent accidents before they happen.

Newly developed GARLON is the time-saving, money-saving answer for maintenance men confronted with a two-fold problem—unwanted weeds and grass, and the prohibitive cost of older methods of vegetation control.

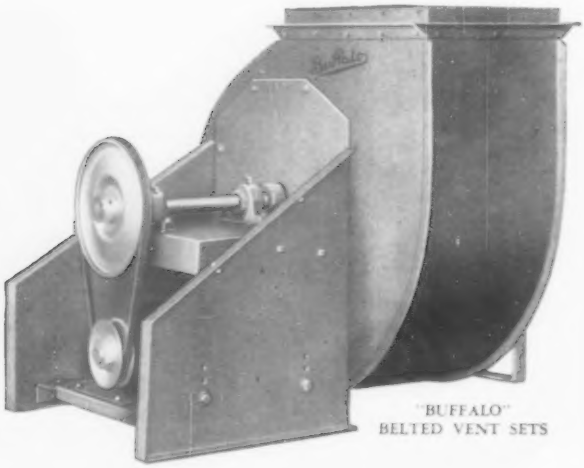
GARLON not only knocks out the entire plant, roots and all, but it can be applied any time that weeds are growing. Now for the first time, you can spread your maintenance dollars over the entire season, and yet receive better control at a real savings. Use GARLON along security fences, in storage areas, drainage ditches and parking lots. Once you start controlling unwanted vegetation this modern chemical way, you'll find the job gets easier and more economical from season to season.

Your own maintenance crews will find it easy to get professional results with easy-to-mix and use GARLON. Or you can have the job done for you at low cost by a professional spraying contractor. Complete information is contained in the new Dow book, "Plant Site Vegetation Control". Write today for your free copy. THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Dept., Midland, Michigan.

*TRADEMARK OF THE DOW CHEMICAL COMPANY

YOU CAN DEPEND ON DOW

For more facts circle 540 on Reader Service Card



"BUFFALO" BELTED VENT SETS

SPOT THESE LOW-COST VENTILATION "PACKAGES" EXACTLY WHERE NEEDED

"Buffalo" Belted Vent Sets will provide your plant with quiet, efficient, economical ventilation — *where you need it — to the exact degree required.* These *flexible* ventilating "packages" enjoy wide use in a number of industrial applications, large and small.

"Buffalo" Belted Vent Sets are ideally suited for smaller, independent plant systems. They meet the need for larger systems with expanding or variable requirements. They are readily adaptable to separate systems located in various parts of the plant.

These easy-to-install package units are unusually quiet and highly efficient, because they bring you all the outstanding engineering features developed during the 81 years of "Buffalo" fan engineering experience. These include patented, double-curved blade, non-overloading, factory-balanced wheels and correctly-designed inlet vanes. The result is stable fan performance over the entire operating range. Adjustable pitch motor sheaves permit capacity changes to meet future requirements.

Capacities range from 500 to 20,000 cfm. All-weather drive cover is available for outdoor installations. Special protective coatings and fume hood exhauster can be specified. These units can also be adapted for induced draft service to handle gases up to 600° F.

Ask your nearby "Buffalo" engineering representative about the many advantages of "Buffalo" Belted Vent Sets or write for Bulletin 3720-A.

BUFFALO FORGE COMPANY
471 Broadway • Buffalo, N. Y.
Buffalo Pumps Division, Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

INDUSTRIAL EXHAUSTERS • BELTED VENT SETS • PROPELLER FANS • "E" BLOWERS-EXHAUSTERS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

151—Shure-Set Tool does both hammer-in fastening work and drilling into brittle materials like face brick or tile. After removing drill, same tool can be used for driving fasteners into hard materials like cinderblock or thin steel. *Olin Mathieson Chemical Corp.*

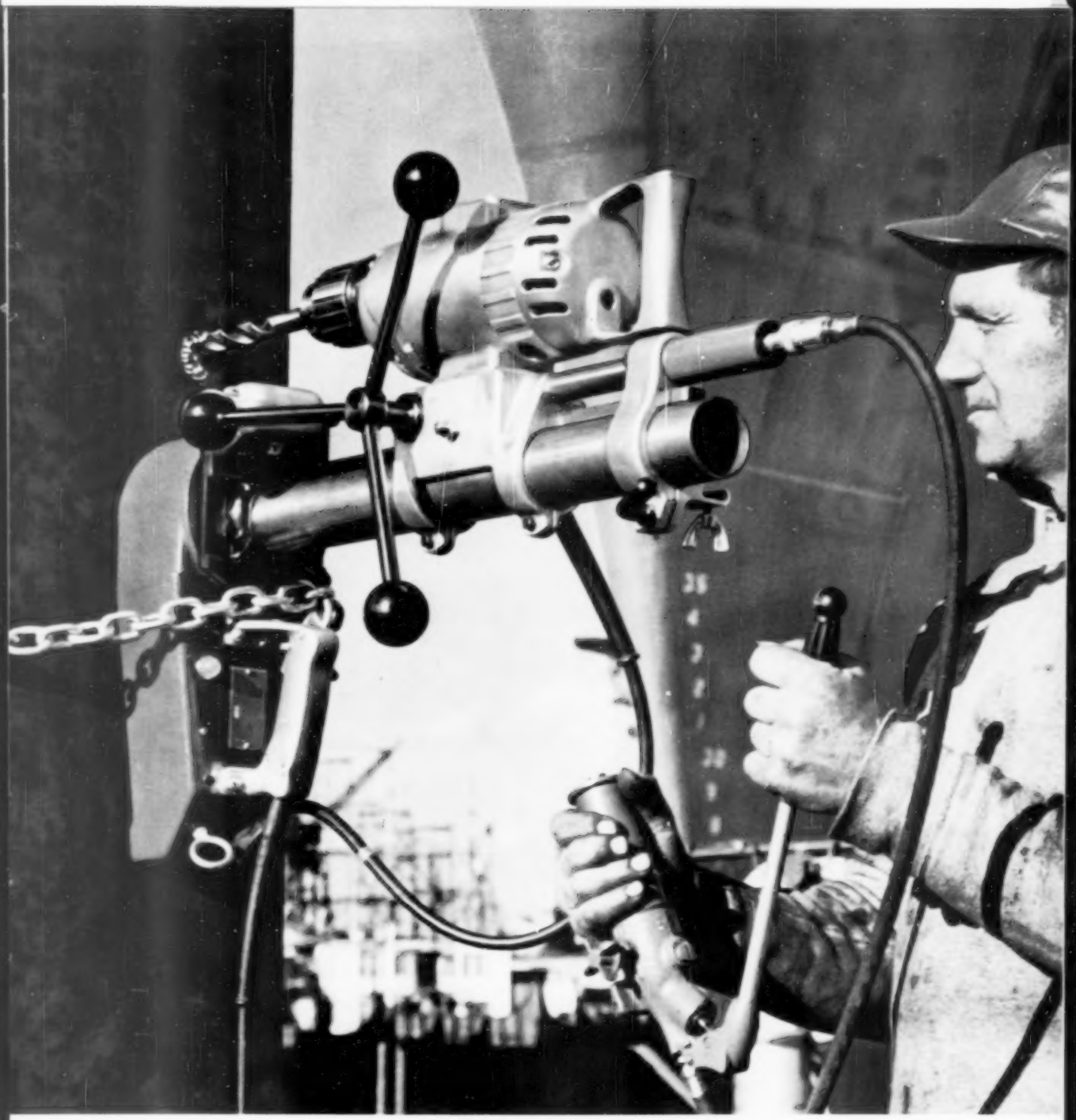
152—Riding Model of maker's electric Hi-Lift Truck has a non-slip platform on which operator stands —with all operating controls at his fingertips. Standard units have 4000-6000-lb. capacities, lift of 72 in., platform length of 30-60 in. *Barrett-Cravens Co.*

153—Bell Filters for use on industrial liquids are reported to remove impurities as small as 1/10 micron. Filters are available with glass- or rubber-lined tanks, come complete with pump, are easily hooked into any oil or coolant line. *Bellwood Engineering, Inc.*

Turn the page

For more facts circle 541 on Reader Service Card

For more facts circle 542 on Reader Service Card ➤



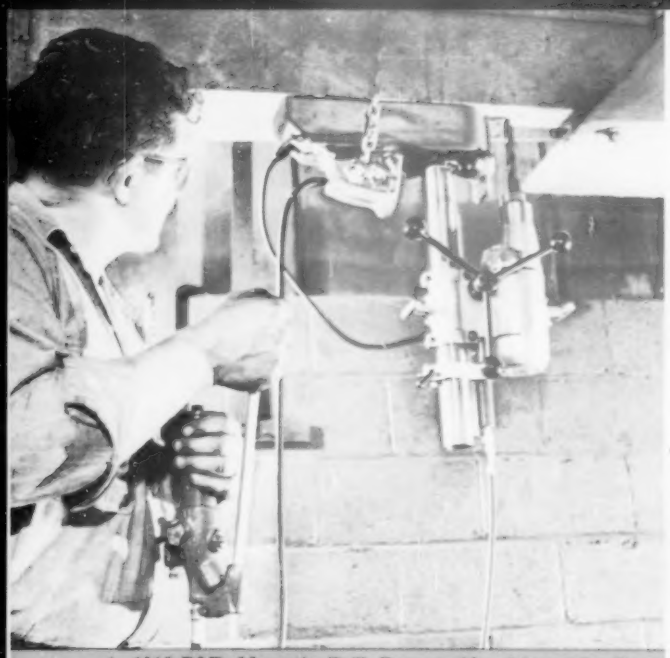
Sticks like glue . . . works in any position

You are looking at a Black & Decker Magnetic Drill Press at work 15 feet above the ground! No operator holds it—it *holds itself* to the work with over a thousand pounds of magnetic power. No operator touches it—he feeds it precisely into the work with fingertip pressure on the exclusive B&D Hydra-Power Feed. It may be used in any position—upside down, on its side or upright.

The new B&D Magnetic Drill Presses are truly so unusual they must be seen to be appreciated. They come in two capacities—$\frac{3}{4}$" and $1\frac{1}{4}$". They are complete precision units—not attachments. They drill, ream and tap in any position. They are ideal for tool shops, steel fabricators, heavy machinery, maintenance . . . anywhere you have to take a drill press to the work.

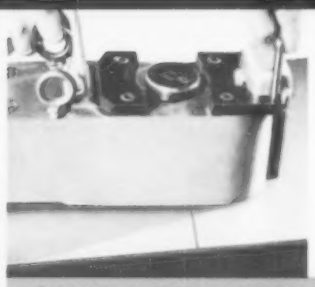
See the feature story on the

New Black & Decker Magnetic Drill Presses



▲ 1¼" B&D Magnetic Drill Press tackles job overhead! (Up to 1¼" capacity.)

▼ ¾" Black & Decker Magnetic Drill Press working in upright position. (Up to 13/16" capacity.)

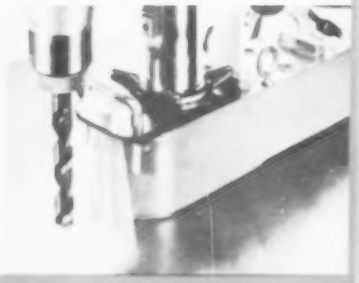


▲ **Multiple Use!** Magnetic Unit of 1¼" press may be used to hold pieces for butt welding, aligning, etc!

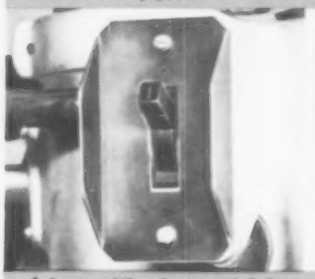
▲ **Closest Tolerances!** Drill Point Locator provides accuracy never before possible! Built into magnet.

Check these exclusive Black & Decker features!

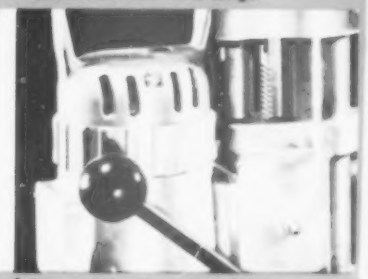
▲ **Safety-Grip Switch** keeps magnet always "on" after operator releases switch trigger—another safety plus.



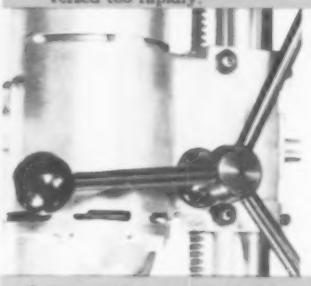
▲ **Work Area Brightly Lit** by exclusive headlight. Simplifies positioning. Special ruggedized bulb withstands hard usage.



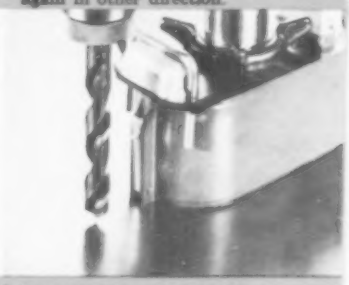
▲ **Longer Life—Increased Safety** results from built-in time delay in 1¼" Reversing Switch. Prevents motor being reversed too rapidly.



▲ **Longer Life—Increased Safety** as ring type Reversing Switch of ¾" Press is turned. Switch goes to "neutral" then "on" again in other direction.



▲ **Highest Accuracy** results from unitized construction of drill press—cannot work loose, no side play.



▲ **Increased Safety** due to location of magnet near drill point. Maximum magnetic power at drill pressure point.

Drilling . . . Reaming . . . Tapping. Upside down . . . right side up . . . sideways . . . there's nothing like a Black & Decker Magnetic Drill Press. See it soon in your shop!

MAIL COUPON TODAY FOR A FREE DEMONSTRATION!

THE BLACK & DECKER MFG. CO., Dept. 0704, Towson 4, Md.

Gentlemen:

☐ Please arrange a demonstration of your .....1¼"; .....¾" Magnetic Drill Press

☐ Please send me additional information

Name ..... Title ...

Company .....

Address .....

City ..... Zone ..... State .....

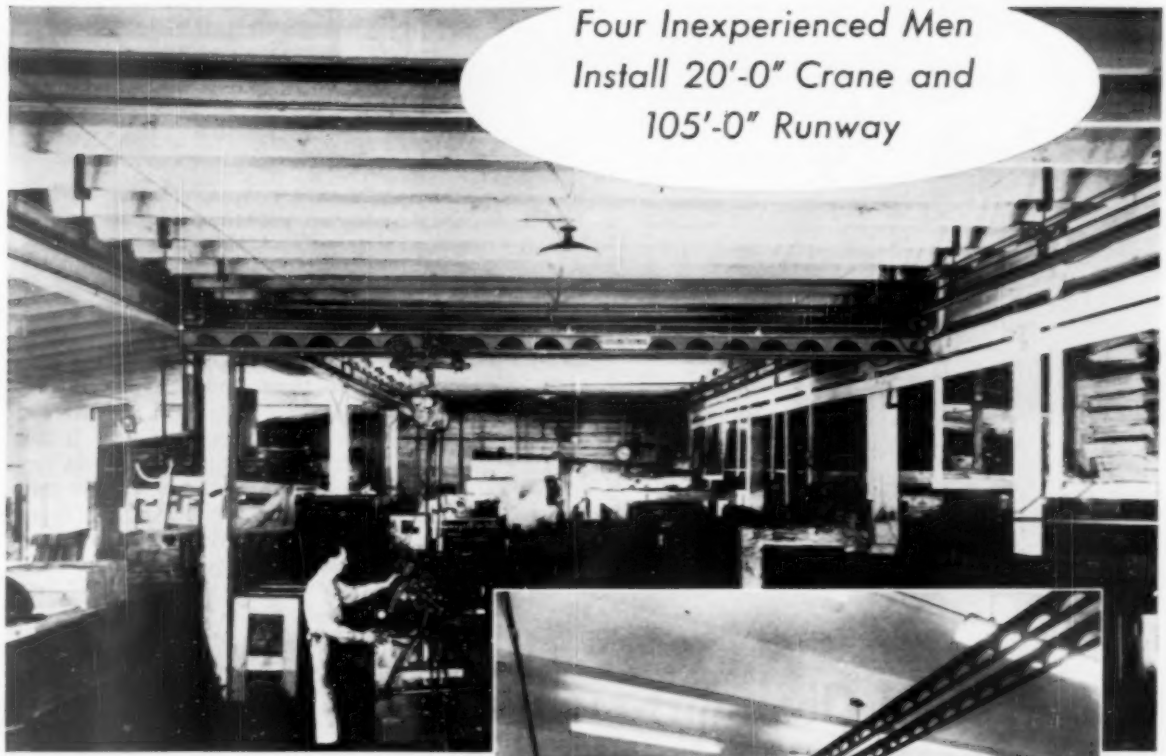
Look Under TOOLS-ELECTRIC in Yellow Pages

Leading Distributors Everywhere Sell

Black & Decker®

Quality Electric Tools — Power-built for top performance

Erects Own Tramrail System in **One Day!**



This entire crane installation was erected by four inexperienced men in 7¾ hours. It permits storing more in a given area and makes the work of handling heavy machines much easier.

New 10,000 square foot plant addition for parts department and assembly section. The entire space is void of posts and pillars. Cleveland Tramrail cranes provide complete mobility of machines over the entire area.

THE ease and speed with which Cleveland Tramrail overhead materials handling equipment can be erected was forcefully demonstrated at the Armstrong Manufacturing Co., Portland, Oregon.

This company has specialized for more than 50 years in the manufacture of precision saw maintenance equipment for the entire lumber industry. It wished to erect a crane and runway as quickly and economically as possible. A shop foreman and three laborers were assigned to the job. All of the men were inexperienced, having never done any erection work of this nature before.

The entire crane installation, consisting of a 20'-0" crane and 105'-0" runway, was put up in 7¾ hours. The work required the drilling of holes into wood ceiling beams and bolting yokes into place. The track was erected quickly because of Cleveland Tramrail's flexible method of support which permits easy leveling and height adjustment. This readily compensated for the slight roof pitch. Only the one-ton hoist is electrified. For this, three conductor bars were installed along one runway track and on the crane bridge.

This installation has proven such a great space saver and labor saver that an extensive Cleveland Tramrail installation was incorporated into a 10,000 square foot building addition recently completed.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3237 E. 290 ST. • WICKLIFFE, OHIO

For more facts circle 543 on Reader Service Card

6 new Multi-Clean dirt-resisting waxes excel in 13 scientific tests

Each of MULTI-CLEAN'S new Waterproof Waxes has proved itself by passing 13 rigorous tests.

In these tests they have been compared with leading competitive brands and proved excellent or superior in stability, light color, levelling, drying time, adhesion, buffability, gloss, slip resistance, wear resistance, water resistance, color retention, easy removal . . . and *dirt resistance.*

They resist dirt! Yes, these Waxes actually resist soiling. MULTI-CLEAN research has discovered how to formulate these Waxes so they are completely free of the "inherent tack" present in so many other waxes and similar finishes. They mean your floors will need cleaning less often and when they *do* become soiled, dirt is easily buffed off.

You can now obtain MULTI-CLEAN Waxes with solids content of 12%, 15% and 18%. Each is available in regular and anti-slip formulations.

Used according to the MULTI-CLEAN METHOD, these unusual new Waxes will help your men save hours of time, gallons of material.

For complete information on the scientific MULTI-CLEAN METHOD of floor care and these new *dirt resisting* Waxes, see your nearest MULTI-CLEAN Distributor or write today to Multi-Clean Products, Inc., St. Paul 16, Minnesota.

ANOTHER PRODUCT OF MULTI-CLEAN RESEARCH

MULTI-CLEAN Method

The combination of the right Multi-Clean Equipment and Materials with the correct procedure.

MAIL COUPON TODAY!

MULTI-CLEAN PRODUCTS, INC. Dept. FM-6168
St. Paul 16, Minnesota

Send information on scientific MULTI-CLEAN METHOD for: ☐ Asphalt tile; ☐ Concrete; ☐ Rubber tile; ☐ Gym Floors; ☐ Terrazzo, Oxychloride; ☐ Vinyl tile; ☐ Other (specify)_____

Name_____ Title_____

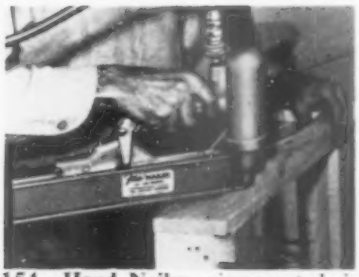
Address_____

City_____ Zone____ State_____

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



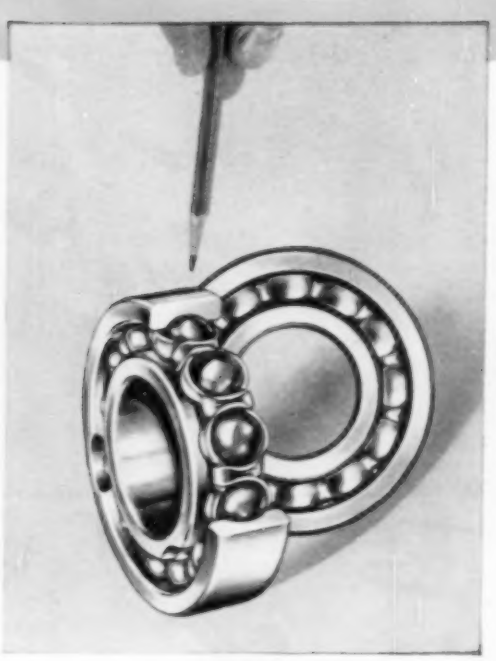
154—Hand Nailer, air-operated, is said to do anything a hammer can do—and five times faster! It can clinch, toenail, drive a nail in any position; can set standard box nails automatically at rate of 90-100 per min. Weighs 3½ lb. *International Staple & Machine Co.*

155—Small Parts Pans made of vulcanized fiber make ideal storage and transport containers for electrical components, machined metal pieces, other small parts. They're lightweight, non-contaminating; can be nested. Five sizes. *National Vulcanized Fibre Co.*

156—Stencil Cutting Unit that cuts stencils with air power is designed to fit all of maker's stencil machines already in operation as well as new units. Operator selects desired letter, pushes button; no manual power is needed to cut letter. *Ideal Stencil Machine Co.*

Turn the page

WHICH BEARING IS RIGHT FOR YOU?



Play it safe! Do business with an AUTHORIZED FAFNIR DISTRIBUTOR

Two ball bearings — both identical in size and made to the same tolerances.

The difference? The bearing on the left is a Conrad, or non-filling slot type. It is designed to take combined thrust and radial loads.

The other bearing — a filling slot type — features the maximum possible number of balls. It is generally specified where bearings are subjected to relatively heavier radial loadings, with only moderate thrust loads.

Differences such as this in bearings and bearing units can often spell the difference between proper machine performance and costly breakdowns. To be sure the bearings you buy are right for the job, do business with an Authorized Fafnir Distributor.

He's a bearing specialist. The know-how and expert technical services he offers are valuable extras available to you wherever you find the Fafnir sign.

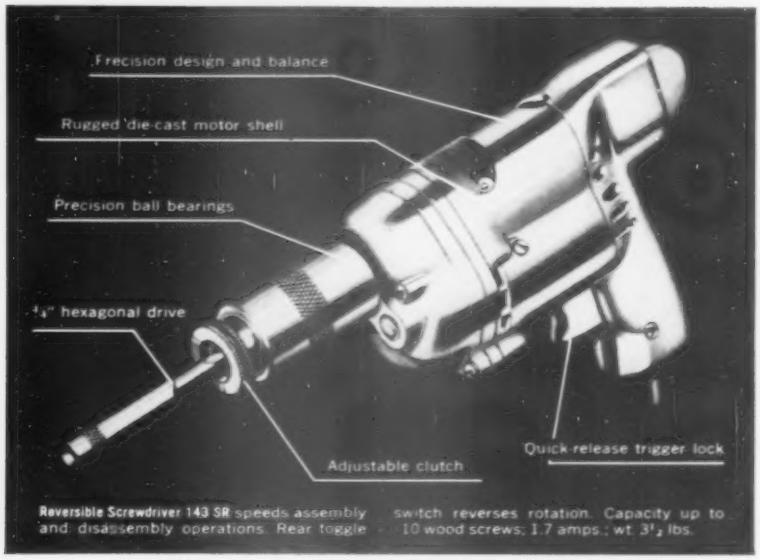
What's more, by ordering from him, your bearing needs are met from stocks of the latest manufacture, and design. You avoid the risk of equipping with obsolete bearings, or units that are second-best substitutes.

Play it safe! For the most effective and cooperative help with bearing selection, supply, and service, do business with your Authorized Fafnir Distributor.

THE FAFNIR BEARING COMPANY, New Britain, Connecticut

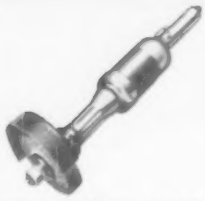
For more facts circle 545 on Reader Service Card

POWER to boost job efficiency with REMINGTON tools



Reversible Screwdriver 143 SR speeds assembly and disassembly operations. Rear toggle switch reverses rotation. Capacity up to 10 wood screws; 1.7 amps.; wt. 3½ lbs.

Flexible Shaft Machine 8 FGP for grinding or sanding has full 360° swiveling pedestal base, 6' shaft, 3-HP motor geared to operate at 4,500 rpm.



Grinder, PG 506S; air-powered; 6" wheel capacity; 6,000 rpm at 90 psi; governor holds even speed; steel motor housing takes rough handling.

Impact Wrench W-120 has reversible AC-DC, 4-amp. motor. Capacity ½"; speed: 1,900 rpm free; 1,400-rpm load. Cuts job time in maintenance.

Powerful, rugged, easy-to-handle—Remington Power Tools help you boost output and ease the tough jobs. They're precision-built for long service and minimum maintenance. Your Remington Distributor stocks and services the industry's widest selection of quality power tools and parts.

Heavy Duty ⅜" Drill 384 has high torque capacity: ⅜" steel, ¾" wood. Powerful 5-amp., AC-DC motor; ball and needle bearings; net 8½ lbs.

Polisher, 57P; 9" bonnet; free speed 1,400 rpm; load speed 840 rpm; 7-amp., AC-DC motor; 115 or 230 v.; heavy-duty ball bearings.

CHOOSE THE POWER MOST EFFICIENT FOR YOU. REMINGTON POWER TOOLS ARE AVAILABLE IN **AIR · ELECTRIC · GASOLINE-DRIVEN MODELS**

Remington *Mall*

MALL TOOL COMPANY . . . Division of Remington Arms Company, Inc., Bridgeport 2, Conn. In Canada: Mall Tool, Ltd., 36 Queen Elizabeth Blvd., Toronto, Ont.

FREE CATALOG

Send for illustrated catalog showing complete line of Remington Contractor & Industrial Tools with specifications and performance data. Mail the coupon—there's no obligation.

Specifications subject to change without notice.

MALL TOOL COMPANY EMM 6
Division of Remington Arms Company, Inc.
Bridgeport 2, Connecticut

Please send—without obligation—FREE catalog on Remington Contractor & Industrial Tools.

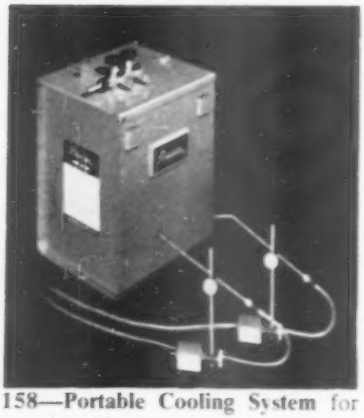
Name _____ *Position* _____
Company _____
Address _____
City _____ *Zone* _____ *State* _____

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

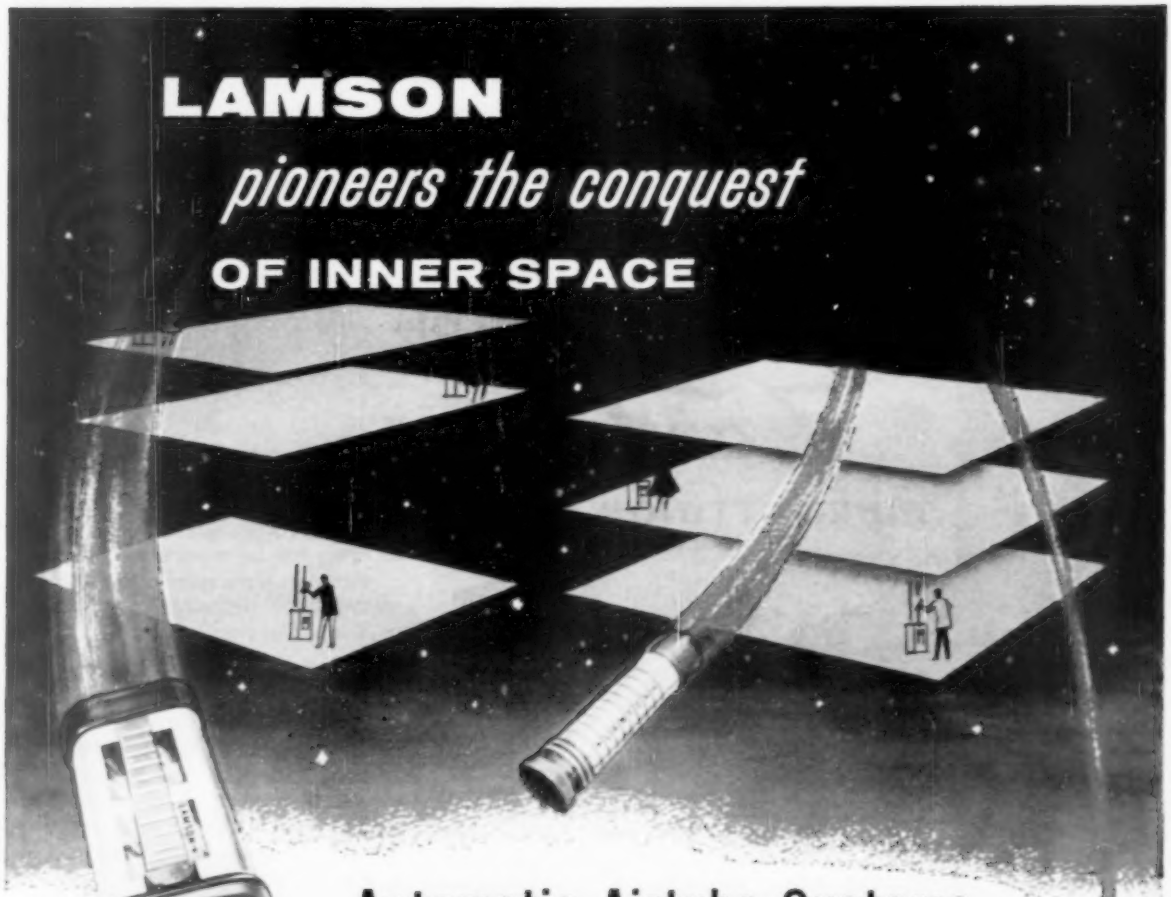
157—Aluminum Chip Buggies replace maker's steel buggies to haul off cuttings and chips from automatic cutting machines. Weighs 140 lb. — compared to 375-lb. weight of steel buggy. Roller bearings in cast aluminum wheels make them easy to push. *E. W. Bliss Co.*



158—Portable Cooling System for metalworking operations reduces temperatures of entire work area by refrigeration. Special lubricating concentrate deposited on cutting tool and work surfaces reduces temperature to 20 deg. below ambient. *Precise Products Corp.*

159—Polyethylene Packager packs parts, liquids, bulk or packaged products with equal facility—at low cost per package. Weight of material to be packaged initiates machine's automatic operating cycle; cycling time can be as fast as 3000 per hour. *E-Z Packaging Corp.*

Turn the page



Automatic Airtube Systems

orbit inner space movement at 30 ft. per second

To you the most important form of space travel covers the area enclosed by the walls and ceilings of your plants and offices. Your drawings, samples, tools, small parts, punch cards and correspondence will swing into a 30 feet per second *controlled orbit* when carried by a Lamson Automatic Airtube System. Our carriers select the right destination—whether 10 or 10,000 feet away—with automatic accuracy. And messengers will be released for more productive work.

Whether your inner space is large or small, our complete line of Airtubes and modern, fully integrated package conveyor systems will bring you a material handling network that is out of this world!

Every Lamson system is engineered, built and installed by Lamson. There is *one* responsibility back of the complete job.

The Lamson field engineer in your area would be pleased to study your operation . . . to prove Lamson can contribute to the conquest of *your* inner space. Write us today.

LAMSON

LAMSON CORPORATION • 603 Lamson Street, Syracuse 1, N. Y.

Plants in Syracuse and San Francisco Offices in All Principal Cities

Manufacturers of Airtubes* (Pneumatic Tube Systems) • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors* • Clinical History Lifts • Trayveyors® • Food Service Systems • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems • Mobilift® Industrial Trucks

*Trade Mark

For more facts circle 547 on Reader Service Card

Van-Cor is an unplasticized polyvinyl chloride that resists the corrosive action of hundreds of industrial acids and alkalis as well as sewage waste and brine. Van-Cor piping costs less, is lighter in weight, and easier to install than conventional pipe. It is readily formed, machined, threaded and welded. Available in normal and high impact types. On many installations where metallic piping was eaten up *in a few months,* Van-Cor pipe has served *for years without deterioration.* Thus it quickly returns its cost and pays handsome dividends.

Van-Cor sheets are also fabricated into ducts, hoods, chemical tanks, fumestacks, etc.

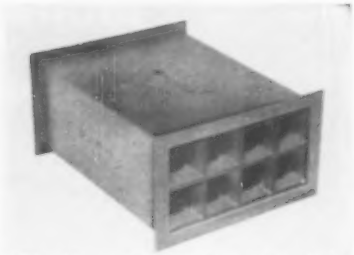
Write for Catalog and Name of Nearest Distributor

INDUSTRIAL DIVISION OF...
COLONIAL PLASTICS MFG. CO.
Subsidiary of THE VAN DORN IRON WORKS CO.
2685 EAST 79TH STREET CLEVELAND 4, OHIO

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



160—Acousti-Duct is a "straight-thru-air-flow" silencer for heating and ventilating systems. Comes in both circular and rectangular sections; can be constructed of special materials for corrosive atmospheres, extreme temperatures. *General Sound Control, Inc.*

161—PVC Fume Scrubber is designed to entrain and scrub objectionable and hazardous fumes, vapors, and dusts that are unavoidable by-products of industrial processes. Its resistance to corrosion is said to surpass many steels and alloys. *Schutte and Koerting Co.*

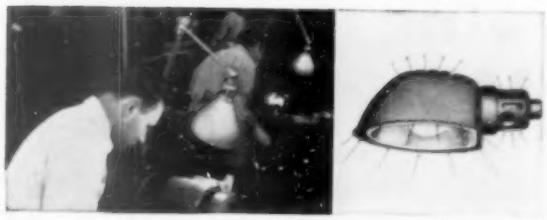
162—Modubox Tote Boxes adjust to protect varied-size parts during assembly, transport, and storage. Adjustable dividers inserted into ribbed walls make separate compartments from 1-in. square to entire box size. 60 standard sizes. *Hollywood Plastic Arts, Inc.*

163—"Tool-Gard" is a dual-purpose load-measuring instrument designed for use on any machine tool operation. It gives constant visual indication of tool wear and monitors machine-tool overload or underload conditions. Amperage ranges up to 300 a-c. *Futurmill, Inc.*

Turn the page

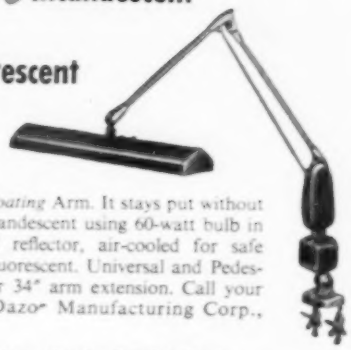
DAZOR FLOATING LAMPS

Fit the Lighting to Each User and Each Job



Top-Mounted Reflector — Side-Mounted

Air-Cooled **Incandescent or Fluorescent**



People . . . jobs . . . lighting needs differ. Let each employee control light location with the Dazor *Floating* Arm. It stays put without locking. Choice of Incandescent using 60-watt bulb in top- or side-mounted reflector, air-cooled for safe handling; or 2-tube Fluorescent. Universal and Pedestal models with 24" or 34" arm extension. Call your Dazor distributor. Dazor Manufacturing Corp., St. Louis 10, Mo.

circle 549 on Reader Service Card

LAWSON TORPEDO® WASTE RECEPTACLES

...5 Smart models

PUSH-DOOR Models
No. 901—12 gal.
No. 1001—15 gal.
No. 1901—17 gal.
No. 2001—21 gal.
DROP-IN MODEL
No. 3003—16 gal.

Outer shell lifts easily for quick emptying

Steel body, stainless steel trim and self-closing push door. Galvanized inner container, bonderized outer shell. White, red, grey, or green baked enamel.

See Your Dealer

The F. H. LAWSON Co. Established 1816 | 801 EVANS STREET CINCINNATI 4, OHIO

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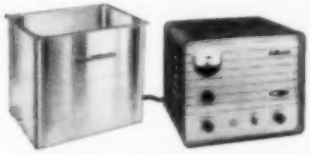
MAMMOTH narda SONBLASTER

America's first mass-produced industrial-size ultrasonic cleaner!

SAVE *7 ways over costly solvent, alkaline or vapor degreasing:*

• Clean faster, speed production! • Cut rejects, eliminate bottlenecks! • Save on chemicals & solvents! • Eliminate expensive installation! • Cut maintenance and downtime! • Save on floor space! • Release labor for other work!



G-1501 generator, NT-1505 tank.

MAMMOTH 5-GALLON TANK $695

Other models from $175. 2-year guarantee on all units.

SPECIFICATIONS

Interior Tank size (in.), 10W x 14L x 9½H. Tank Capacity, 5 gallons.

Submersible Transducers

Model NT-604 — Hermetically sealed heli-arc welded stainless steel case. Radiating face: 27 sq. in. Effective plane of radiation: 40 to 50 sq. in. (approx. 10" x 5"). Effective cavitation of volumes: up to 1200 cu. in. at 24" tank height (5 gal.) and 2400 cu. in. at 48" tank height (10 gal.). Swagelok tube fitting on side or end for internal tank wiring.

Model NT-605 — Same as NT-604 except for bulkhead fitting on back for external wiring. Eliminates electrical conduits in solutions.

Now you can say goodbye to expensive chemicals, solvents, and degreasing equipment . . . reclaim valuable floor space . . . eliminate high installation costs . . . just by installing a Narda Series 1500 SonBlaster. At the same time, you'll get better, faster cleaning, and you'll need fewer people to do the job!

Get the tremendous activity of the new 200-watt Narda SonBlaster, with the largest transducerized tank ever made, at the lowest price in the industry! Choose from transducerized tanks or submersible transducers for use in any arrangement in any shape tank you desire. Up to 4 submersible transducers can be easily operated from the same generator at one time; load selector switch provided — an exclusive Narda feature.

Simply plug the SonBlaster into any 110-115 V AC line, and flip the switch. In seconds, you'll clean 'most any mechanical, optical, electrical, medical or horological part or assembly you can think of. Perfect, too, for brightening, polishing, radioactive decontaminating, pickling, quenching and plating; emulsifying, mixing, sterilizing, impregnating, degassing, and other chemical process applications.

Mail the coupon for free help in determining the model that's best for you.

The SonBlaster catalog line of ultrasonic cleaning equipment ranges from 35 watts to 2.5 KW, and includes transducerized tanks as well as immersible transducers. If ultrasonics can be applied to help improve your process, Narda will recommend the finest, most dependable equipment available — and at the lowest price in the industry!

The Narda Ultrasonics Corporation
118-160 Herricks Road
Mineola, L. I., New York
Department FM-6

Gentlemen:
Please send me more information about
☐ Series 1500 SonBlasters
☐ The complete Narda line

Name _____
Organization _____
Address _____
City _____
Zone ____ State _____

the narda ultrasonics corporation
118-160 HERRICKS ROAD, MINEOLA, L. I., N. Y.
Subsidiary of The Narda Microwave Corporation

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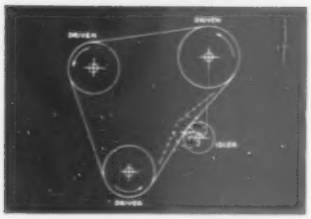
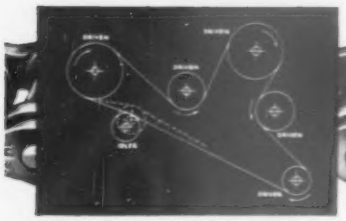

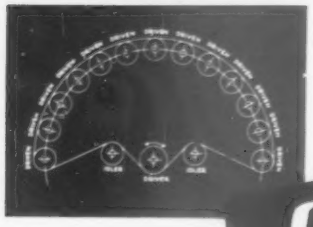

for efficiency and economy

drive it with ACME chains and sprockets

In any drive where maximum efficiency is essential you will find Acme precision roller chain and sprockets are readily adaptable. Illustrated at the left are several drive applications.

Use Acme Chain drives wherever dependable, efficient and economical transmission of power between parallel shafts is required. Their correct principle of design provide operating characteristics superior to any other means of power transmission. Acme Chains and Sprockets deliver Positive – Efficient – Economical – Flexible – Rugged – and Quiet Power Transmission. Send your power transmission problems to Acme for the right solution.

Write Dept. 13-M, for new 100-page Illustrated Catalog, including new engineering section showing diagrams of 36 methods of chain driving.

Call ACME for Service

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

COMPLETE LINE OF ROLLER CHAINS AND SPROCKETS • DOUBLE PITCH CONVEYOR CHAINS • STAINLESS STEEL CHAINS • CABLE CHAINS • FLEXIBLE COUPLINGS • STANDARD AND SPECIAL ATTACHMENTS

FACTORY / EQUIPMENT NEWS

Begins on page 128

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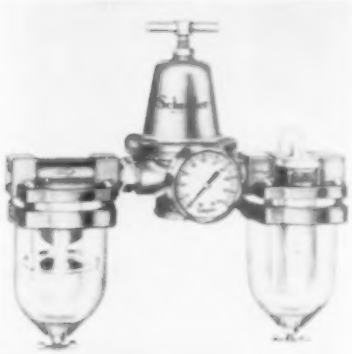

164—Lub-Air-Ator is a compact device that filters air, regulates pressure, and lubricates air lines serving controls or air tools. It has no moving parts and can be serviced without disturbing pipe connections. Various sizes and flow capacities. *A. Schrader's Son.*

165—Roll Thermocouples accurately measure and closely control the surface temperature of rotating rolls, shafts, and bearings. Units feature wear-resistant Teflon plunger; offer fast response for close control, compact design for easy installation. *Conax Corp.*

166—Alkaline Cell Energizer the size of a standard flashlight battery is said to give up to 10 times longer service than the flashlight cell—at only 3 times the cost. Designed for high-drain continuous duty, from −40 to +200 F.; rated 1.5 v. *National Carbon Co.*

Turn the page

"Will somebody please find Jensen!"

(With pagemaster® you'd find him in seconds!)

How often do you waste enormous amounts of time and energy—send your blood pressure soaring—because you can't find key people when you need them?

With a PAGEMASTER *selective radio paging system* by Stromberg-Carlson you can reach the people you want *instantly*. You can measure the value of PAGEMASTER in terms of time, sales—even lives.

Here's how it works. Jensen is equipped with a transistorized pocket-size radio receiver. When you want to contact him, you call him by phone. If he's away from his usual location, your switchboard operator sets his *private code signal* on the encoder (a compact unit located next to the switchboard) and flips a switch.

Instantly his receiver—and no other—responds with a pleasant, but commanding signal. He knows he's wanted, picks up the nearest phone and reports. The page automatically repeats every 20 seconds. As many "Jensens" can be equipped with receivers as you want.

You can have a PAGEMASTER system engineered to your own requirements, whether yours is a single or multi-building operation. Systems are available for lease or purchase. As your needs grow, you can add receivers without additional installation cost.

For details, contact the PAGEMASTER distributor in your area. Or write to us at 203 Carlson Road.

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DO YOU KNOW ABOUT THIS? (Advertisement)

Model WH Hi-Capacity Fulflo Filter with optional Cover-Lifting Device and Pressure Gauges. Note compactness and simplicity of inner assembly.

SAVE TWO WAYS WITH NEW HI-CAPACITY *Fulflo Filter*

The completely new Hi-Capacity Fulflo Filter brings you substantial production savings through decreased downtime and improved quality — plus *lower-than-ever initial cost.*

This compact sturdy steel filter is available in a full range of sizes — with from 24 to 270 10-inch Honeycomb Filter Tubes — for flow rates as high as 1350 gpm or more, depending on viscosity. Brand new cover is fastened by sturdy bolts which swing down when loosened to release cover for easy access to filter tubes. Optional Cover-Lifting Device enables cover to swivel aside for even speedier servicing.

Another outstanding advantage — all standard models are designed for *operating pressures up to 150 psi.* Higher pressure models are engineered to order.

The new Model WH Fulflo Filter provides continuous micro-clarity, at minimum pressure drop, for all types of liquids and gases. Exclusive Honeycomb Filter Tubes provide true *depth* filtration through hundreds of filtering tunnels, precision engineered for uniformity of size, shape and depth. Tubes are available in a wide range of positively controlled densities and in a variety of natural and synthetic fibres.

Fulflo Filters are engineered to your exact requirements. For folder on the new Model WH, write to Department FA.

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

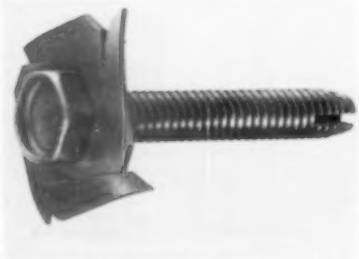
FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

167—Air-Gap Limit Switch that operates without physical contact is designed for mill duty applications where heavy impact and shock damage mechanical limit switches. Unaffected by high temperatures or voltage variations up to ±10%. *Electric Controller Mfg. Co.*

168—Insulation Stripping Tool quickly strips insulation from all types of control cable, flexible cord, telephone cable, and bus drop — without damaging conductors inside weatherproof seat. Lightweight handle provides a good grip. *Mathias Klein & Sons.*



169—Crating Fastener, consisting of pre-assembled crating washer and thread-cutting screw, protects crated shipments from vibration. Four sharp teeth at corners of washer bite deep into wooden crate—deeper when jarred or jolted in shipment. *Illinois Tool Works.*

Turn the page

DO YOU KNOW ABOUT THIS? (Advertisement)

Operatorless Guide-O-Matic tractor on multiple stop-and-go materials moving job.

Automate your materials handling now?

Automated materials handling has intrigued many a plant manager since the introduction of the Barrett Guide-O-Matic system three years ago. Now the proof is in. Many installations of all types reveal highly profitable results.

• **Advantages**—Guide-O-Matic materials handling takes the driver out of tractor operation . . . moves him to more productive duties. Obviously, time and cost savings follow. One plant originally scheduled a three-year write-off—soon cut that about in half. Another replaced a two-shift, five-fork-truck operation with one Guide-O-Matic. So it goes.

Guide-O-Matic also protects the load, equipment and men . . . operates on a precise course without variation or on hazardous short cuts. Aisles may even be narrower, yet safer. Hand in hand with lack of human error and abuse, steady Guide-O-Matic control lowers operating costs.

• **How it works**—The Guide-O-Matic tractor electronically follows either a magnetic wire path in the floor or a painted line. It goes anywhere—can be re-routed at low cost.

Systems may be as automatic as required—simply moving through warehouses or tied into production lines—short or long runs, indoors or out. Guide-O-Matic is no longer a "not-for-me" idea. Its cost is within reason for all plants . . . profit potentials good everywhere. Present applications prove this.

Is this automated Guide-O-Matic materials handling system now for you? Find out simply by contacting Barrett-Cravens. A comprehensive bulletin and engineering advice are quickly available.

BARRETT-CRAVENS COMPANY
616 Dundee Road, Northbrook, Illinois
Representatives in All Principal Cities. Canadian Licensee, S. A. Armstrong, Ltd., Toronto, Canada.

ANOTHER GUIDE-O-MATIC system, safely moving fragile items . . . saving time and money.

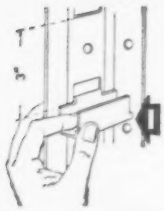
Super-Valu Stores
Westinghouse
Capwell's
Stix, Baer & Fuller
Hallmark
U.S.A.F.
Mercury Motor Express
International Paper
Gulling Auto
Nally's
Corning
U.S. Army
Procter & Gamble
Southern Screw Company
Esso
Fleming
Olin Mathieson
The Hecht Co.
Beckett Paper
EASTMAN KODAK COMPANY

GUIDE-O-MATIC SYSTEMS are at work in large, medium and small plants and warehouses of all types. Some of the present purchasers and users are shown.

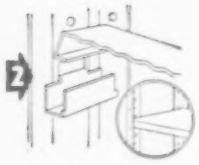
For more facts circle 555 on Reader Service Card

CUT YOUR SHELVING COST WITH BORROUGHS STEEL SHELVING

the most versatile and most adjustable on the market!



Insert shelf support bracket . . no fumbling with studs, bolts, nuts or lock washers.



Tilt shelf into support bracket . . and shelf is ready for loading.

Savings right from the first day of installation! Except for the top shelf (2 bolts and 2 nuts) no bolts or nuts are required for shelves. No tools are needed. This means time and money are saved in erecting units and changing shelves. There is no shelving like Borroughs Shelving. Compare before you buy and you'll be convinced!

BORROUGHS MANUFACTURING COMPANY OF KALAMAZOO

A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT

3020 NORTH BURDICK ST. amp® KALAMAZOO, MICHIGAN

FACTORY / EQUIPMENT NEWS

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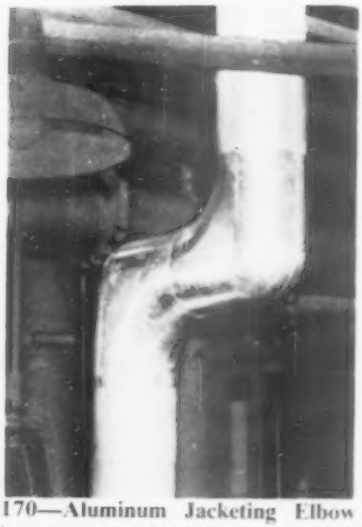
For more about these items, circle item numbers on Reader Service Card next to back cover.



170—Aluminum Jacketing Elbow boasts an oversize radius or "hump" that enables a limited number of units to cover most sizes of insulated piping. Its 12 sizes fit over 107 combinations of varying pipe sizes and insulation thicknesses. *Pittsburgh Corning Corp.*

171—Lift Truck Channels on maker's 10,000-lb. capacity gasoline truck can raise a 4000-lb. load to a height of 30 ft. for special handling jobs and maintenance work. The extra-high channels have an over-all collapsed height of 220 in. *Yale & Towne Mfg. Co.*

Turn the page

The Ludlow Line Protects Your Products Better

Aisle liner for air liners keeps costs down to earth

Ludlow's Aircraft Aisle Liner is laminated with polyethylene to prevent any grease or oil from seeping through to the carpet. The paper is a flame-resistant kraft with two-way creping for strength and pliability

Air lines throughout the country are enthusiastic about Ludlow's new poly-laminated Aircraft Aisle Liner. This greaseproof, flame-resistant paper protects costly aisle carpeting while maintenance crews are servicing the planes. Some air lines also use Aisle Liner while passengers are boarding during rainy weather. The white cloth liners, previously used, incurred laundering costs — often shrank to impractical sizes. Ludlow's Aisle Liner was developed for the sole purpose of solving this problem. It's so inexpensive it could be discarded after one use. But, it's so durable that each liner is re-used several times.

Aircraft Aisle Liner is typical of Ludlow's job-tailored packaging products. Look to Ludlow for greater protection, lower costs and faster packaging. We'll consider it a privilege to serve you!

circle 557 on Reader Service Card

LUDLOW PAPERS, INC.

NEEDHAM HEIGHTS 94, MASS.

Sales Offices in principal cities

VPI-COATED PAPERS • GREASEPROOF PAPERS • WATERPROOF PAPERS • POLY-COATED PAPERS • GUMMED TAPES • FEDERAL SPEC. PAPERS • GUMMED LABEL AND SPECIALTY PAPERS

only
RAYNOR
builds

OVERHEAD DOORS
like these...

Insuring Lasting SATISFACTION and SERVICE

Look to Raynor for those *exclusive* engineering features that provide lasting satisfaction and trouble-free operation in overhead garage door installations. Raynor's "graduated seal" for example, assures easy rolling and finger tip control – yet the door is held tightly against the jamb for secure weather-tite closure . . . a famous Raynor feature.

KNOW THIS MARK OF QUALITY
RAYNOR MANUFACTURING COMPANY
DIXON, ILLINOIS
Builders of a complete line of Wood Sectional Overhead Doors
For more facts circle 558 on Reader Service Card

SAFETY FIRST
and savings, too!

with INSUL-8-BAR®
SYSTEMS

Mobile Safety Electrification for Cranes, Monorails, All Moving Machinery.

These are the only enclosed conductor systems that meet all requirements of mobile safety electrification. Standard catalog parts eliminate the need for special engineering. Installation is fast, maintenance easy. Investigate today!

CLIP COUPON FOR CATALOG
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Dept. C 1369 Industrial Rd., San Carlos, Calif.
Rush catalog re Insul-8-Bar mobile electrification.
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Shorten load handling time with a

READING CRANE!

● One well-known stove manufacturer wanted to speed up assembly—a call to Reading engineers led to complete solution. A 10-ton, double I-Beam, cab-controlled Reading Crane brought even better results than expected.

Get complete information from our latest catalogs or ask a Reading engineer to analyze your handling operations . . . at no obligation.

READING CRANE & HOIST CORP.
CHAIN HOISTS • OVERHEAD TRAVELING CRANES • ELECTRIC HOISTS
2104 ADAMS ST., READING, PA.

FACTORY / EQUIPMENT NEWS

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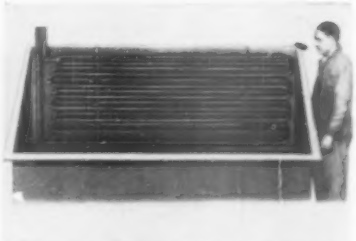


172—Hi-Therm Grid is a compact tank heater (cross-section width: 2¾ in.) for high-speed heating of solutions in plating and caustic tanks, etc. Staggered arrangement of tubes accelerates fluid motion by its high conduction and convection factor. *Rempe Co.*

173—Pallet Loader (Series 300) automatically arranges and places packages on a pallet in a pre-determined pattern and quantity; handles small, fragile packages or heavy rows of packages without stalling, at speeds to 44 cases per min. *Alvey Conveyor Mfg. Co.*

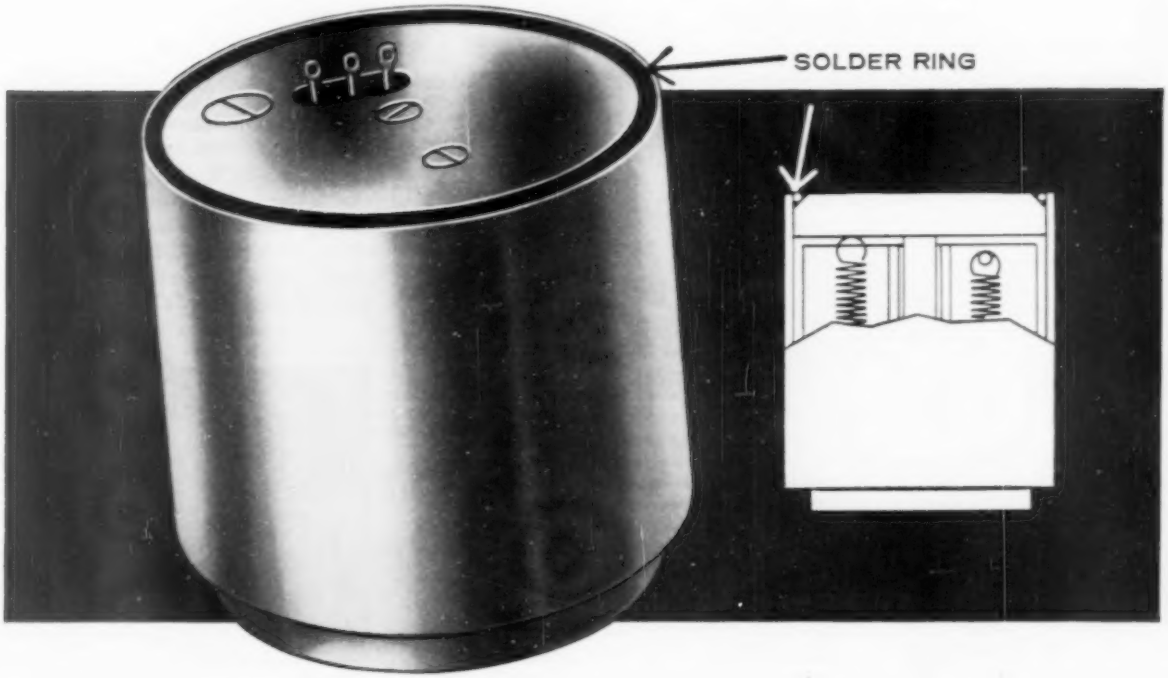
174—Low-Cost Sling is made with an aluminum alloy compression fitting that's non-corrosive and watertight. Sleeve is pressed on—which causes metal of sleeve to flow into spaces between strands — firmly locking the wire rope loop. *Broderick & Bascom Rope Co.*

175—Ultrasonic Cleaner with 150-gal. capacity has a cleaning tank 3 ft. square by 2.5 ft. deep, fitted with 20 bottom-mounted transducers. Systems can be used to clean large parts like complex gear assemblies, or trays of smaller parts. *Acoustica Associates, Inc.*

Turn the page

Precision soldering 7 Times Faster...

with TOCCO *Induction Heating*



When G. M. Giannini and Co., Inc., Pasadena, California, switched from old-fashioned methods to TOCCO Induction Heating they increased production of these high-precision accelerometers from 4 to 30 per hour—with a commensurate *decrease* in production costs.

Here's what a Giannini official has to say about the TOCCO installation: "Prior to using TOCCO for this purpose, we had tried soldering irons, normal torches, resistance sealing, and even threaded screw fittings, with uniformly poor results. Essentially, the TOCCO unit has permitted us to build, in production quantities, oil-filled hermetically sealed units that could not be produced in any other way."

Whether your production bottleneck involves soldering, brazing, heat treating or heating for forming it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

TOCCO

JUST PUSH A BUTTON

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. FF-6 • Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____

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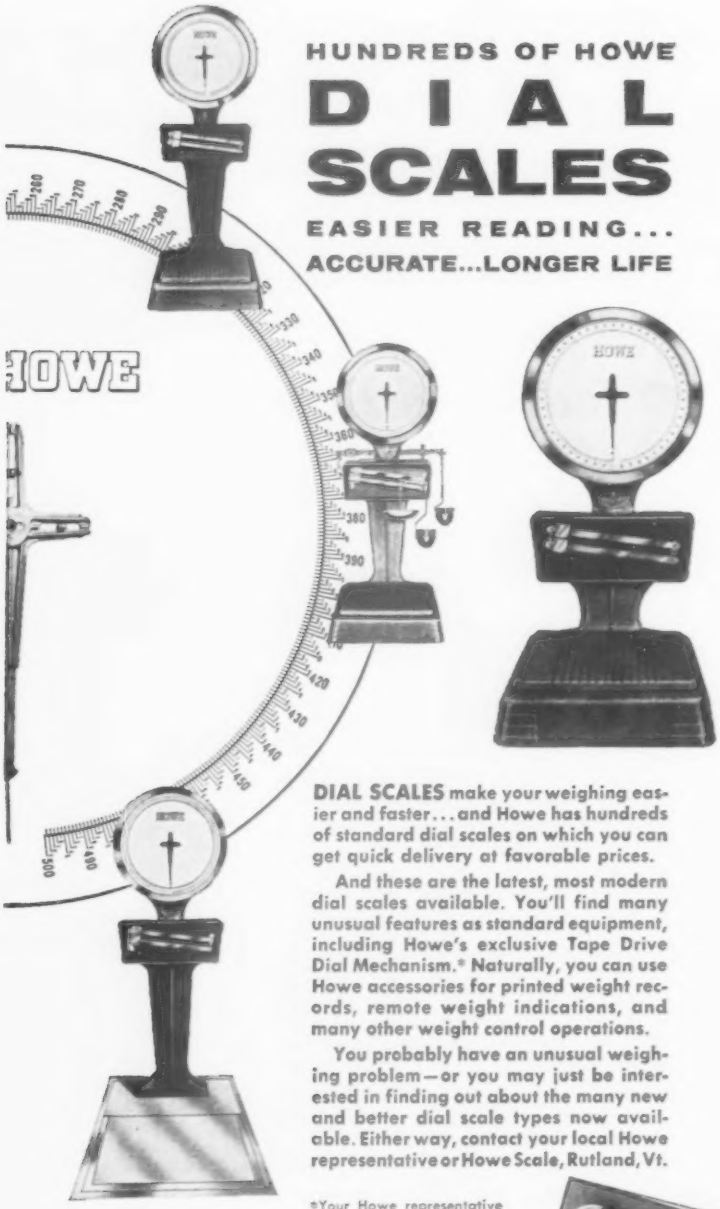


HUNDREDS OF HOWE

DIAL SCALES

EASIER READING...
ACCURATE...LONGER LIFE

DIAL SCALES make your weighing easier and faster... and Howe has hundreds of standard dial scales on which you can get quick delivery at favorable prices.

And these are the latest, most modern dial scales available. You'll find many unusual features as standard equipment, including Howe's exclusive Tape Drive Dial Mechanism.* Naturally, you can use Howe accessories for printed weight records, remote weight indications, and many other weight control operations.

You probably have an unusual weighing problem—or you may just be interested in finding out about the many new and better dial scale types now available. Either way, contact your local Howe representative or Howe Scale, Rutland, Vt.

*Your Howe representative can explain it in detail, but it's a new and patented design which gives even greater accuracy, longer scale life.

NEW! DIAL SCALE CATALOG. Just out! Illustrated; gives specifications on dozens of standard and special types for industry and agriculture. Send for your free copy now!

HOWE

THE HOWE SCALE CO. · RUTLAND, VERMONT
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.

176—Portable Hand Saw with complete line of diamond blades is well worth its weight (60 lb.) in plant maintenance departments. Unit can cut any masonry material in any position. Cuts through 10-in. brick or block walls, concrete floors with ease. *Bulldog Mfg. Co.*

177—Multi-Use Hand Truck with removable handles does many jobs. It's a push-pull truck with both handles on; can be loaded with longer, bulkier packages with one handle removed. Special canvas bag slips over handles for waste collection. Capacity: 800-lb. *Coslon Corp.*

178—No-Diagonal Longspan Joist, with electric-arc welded vertical members, provides a diagonal-free ceiling freeway for easy installation of utilities—ducts, piping, wiring, etc. Spans from 40 to 80 ft., with depths from 22 to 44 in. *Shlagro Steel Products Corp.*

Turn the page

For more facts circle 562 on Reader Service Card

For more facts circle 563 on Reader Service Card ➤

NEW YORK'S COLISEUM USES

ALLEN-BRADLEY

TROUBLE FREE MOTOR CONTROL

Owner: Triborough Bridge and Tunnel Authority
Heating, Ventilating, and Air Conditioning Contractor: Almirall & Co., Inc.
Engineer: Guy B. Panero
Architects: Leon & Lionel Levy

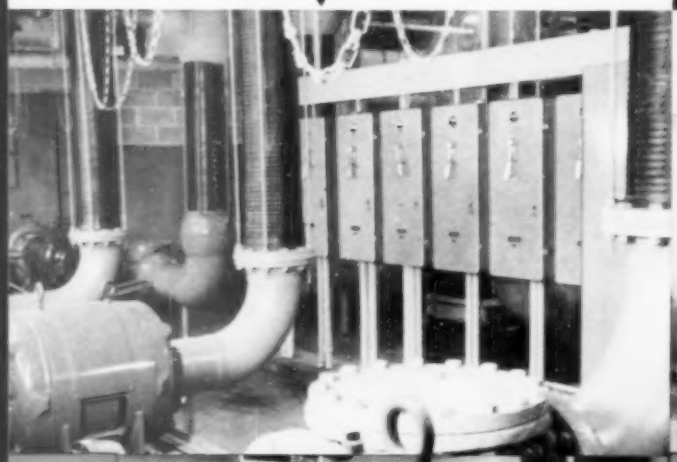
More and more buildings—like the huge New York Coliseum—are being equipped with Allen-Bradley motor control.

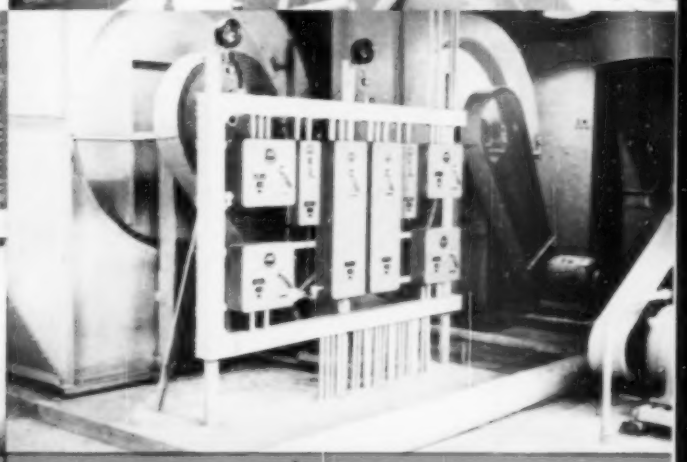
Reliability is the basis for their selection. The simple solenoid—around which all Allen-Bradley motor starters, contactors, and relays are built—has only ONE moving part. This assures millions of trouble free operations. Also, *all* Allen-Bradley magnetic motor control is provided with double break, silver alloy contacts, and contact maintenance is eliminated. These contacts remain in perfect operating condition until completely worn away. The overload relays dependably protect the motor—no matter how long installed nor under what atmospheric conditions they must operate.

Specify Allen-Bradley—the motor control you can install . . . and forget! Send for catalog, today.

Bulletin 740 reduced voltage and Bulletin 712 combination starters for chilled water and condenser pumps. ▶

Bulletin 712 combination starters for booster and condenser water pumps. ▼





◀ Bulletin 712 combination starters, Size 1 and Size 4, mounted in fan room.

▲ This fan room control panel uses eight Bulletin 712 combination starters—including Sizes 1, 2, and 3.

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.

In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

8-58-M

Built to ALLEN-BRADLEY *Quality* STANDARDS!

A-B Control Centers are popular because of their...

Quality Appearance

Quality Construction

A-B QUALITY

BULLETIN 798
Multi-Unit Control Centers

With control centers more than with individual starters, the appearance is often very important—frequently the control center is used as a "show" installation. The "Quality" built into Allen-Bradley Control Centers cannot be beat—it is a "plus" value which you obtain without extra cost.

Naturally, the installation of an Allen-Bradley Control Center provides additional values—such as those outlined below.

ADAPTABLE TO PLANT CHANGES—Entire units can be moved or complete sections can be added to meet plant changes without the need for changing the internal wiring of the control center.

GREATER SAFETY—Centralized control and locked operating handles prevent tampering by unauthorized personnel. Panels have "dead front" construction with buses and wiring completely enclosed.

MODERN APPEARANCE—This neat, compact installation eliminates the unsightly supporting structures of individually mounted starters and the numerous conduits between separate starters.

LOWER OVER-ALL COST—A-B Control Centers arrive wired and tested. Installation cost is a fraction of that for individual starters. Standardized units eliminate custom engineering.

With Allen-Bradley plug-in type units, starters can be added or removed from the section without disconnecting the rest of the control center from the line.

The long and short of it. A-B Control Centers consist of any number of vertical sections assembled into one unit.

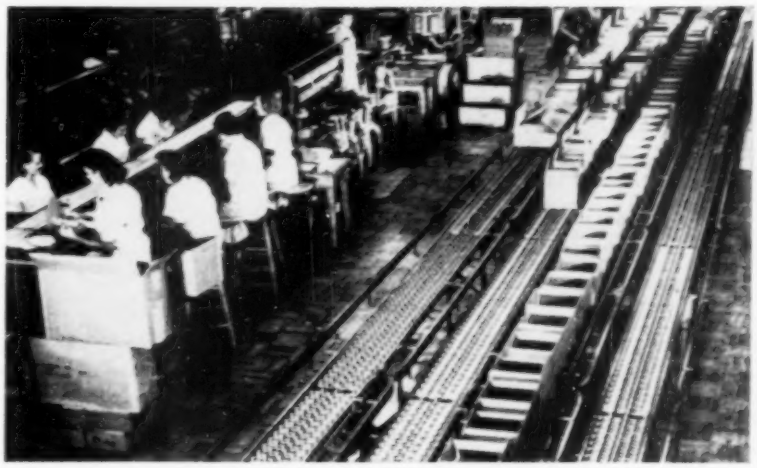
ALLEN-BRADLEY COMPANY

1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

8-58-M

RAPISTAN Ideas HANDLING

How to "Tool up" for Efficient Handling with Rapistan® Conveyors



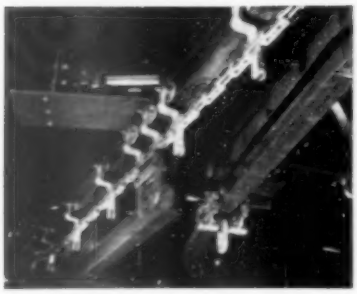
Like a four-lane super highway, Rapistan conveyors line up the cartons for a fast pass through the case sealer. Carton traffic moves in a steady flow. No jam-ups, even at peak rush periods.

PACKAGING AND SHIPPING SHOULD BE WRINKLE-FREE

Even a manufacturer of hand creams can have wrinkles – in his handling system. But Rapistan helped this one smooth them out. Four lines of Rapid-Wheel gravity conveyor handle the job. They move filled cartons from packing operations to a single, centralized case sealing station.

The gravity conveyor now separates cartons by size and accumulates them for longer, more efficient "production" runs through the case sealer. "Down time" for adjusting the sealing machine is reduced. A maze of multiple handling is eliminated, and a lift truck traffic problem has been solved. For examples of other Rapistan systems at work, **circle No. 1** on the coupon.

NEW POWER-PUSH OVERHEAD CONVEYOR



Now you can have the advantages offered by "power and free" overhead trolley conveyor, at a fraction of the heavy-duty conveyor cost, in new Power-Push conveyor from Rapistan-Keystone, Inc.

Any portion of the work being conveyed can be diverted from the power line to a "free" track (automatic or manual controls) for storage, special processing, assembly, order selection, inspection or testing, then returned to the power line when desired. Power-Push is economically practical for interrupted overhead flow applications in small, medium and large manufacturing plants and many service industries. **Circle No. 2.**

Cure Inventory Headaches With Rapistan Flow Rack™

Taking inventory, that perennial nuisance in every business, is fast and easy when you store goods in Rapistan Flow Rack. No wasted time counting every item by hand count. The inventory taker simply identifies parts by the numbers labeling each hatch opening in the rack. He knows how many parts each pan contains. By viewing the number of pans in each hatch opening, he gets the total count.

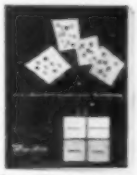
In this specific rack, over a hundred different items are stored in a compact and orderly way. Wouldn't you like to take your next general inventory without having to shut down operations? **Circle No. 3** for information.

If you use small parts in large quantities, Flow Rack is the most efficient way to store them — and count them. This inventory counter takes the tally in a matter of minutes.

Take Tight Handling Turns With This New Turn Table

Rapistan's new, powered "turn table" gives you a smooth, protected turn when transfering materials between adjoining lines of power or gravity conveyor. This improved Power Turn Table features a more powerful drive, and a die-formed table of heavy steel plate. For complete information on new model and application ideas, **circle No. 4** on the coupon.

NEW RAPISTAN IDEA BOOK ISSUED THIS MONTH



Over 70 good, practical ways to handle materials efficiently in receiving, manufacturing, processing, warehousing and shipping are illustrated and described in this new handbook of materials handling ideas. Send for it today. **Circle No. 5** on the coupon.

Rapistan®
new ideas in materials handling

The RAPIDS-STANDARD CO., Inc.
373 Rapistan Bldg. Grand Rapids 2, Mich.

circle the items of particular interest to you, clip this coupon, and mail it attached to your letterhead

1 2 3 4 5

For more facts circle 564 on Reader Service Card

"THIS LUBRICANT PRACTICALLY ELIMINATED BEARING REPLACEMENTS"

Says- C. O. SPARKS, INC.
& Mundo Engineering Co. of Los Angeles, Calif.

"Prior to using LUBRIPLATE, we were replacing shaker screen bearings within 60 to 120 days due to lack of or faulty lubrication. Since we started using LUBRIPLATE seven years ago, we have only replaced two shaker screen bearings and these because of natural wear. We now use LUBRIPLATE for general lubrication throughout our plant."

W. T. Ellington, President
Mundo Engineering Co.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

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FACTORY / EQUIPMENT NEWS

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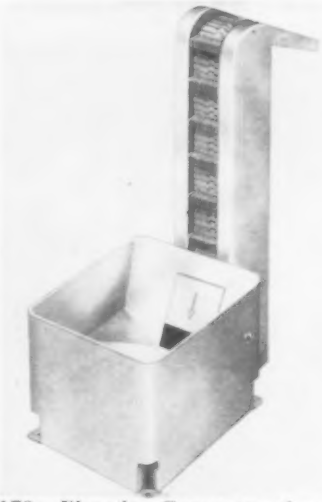
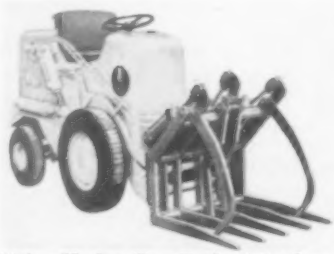


179—Elevating Conveyors of vertical design save floor space with floor level loading to avoid high-lift hopper filling. Conveyor's self-cleaning cleats avoid slowdowns due to snarling of parts. Hopper capacity is approximately 5 cu. ft. *Automation Devices, Inc.*



180—Hydraulic Grab Attachment for maker's tractor-shovels can greatly reduce a plant's scrap-handling time. It's designed for fast loading, carrying, and dumping of unusual material — such as metal turnings, battery plates, bales, drums, etc. *Frank G. Hough Co.*

181—Sump-Vac is a vacuum-unit-on-wheels for removing cutting oils and coolants from sumps of all types of machine tools. It hooks on in-plant trucks for movement around plant; can be powered from 80-lb. compressed air line. Capacity to 225 gal. *Spencer Turbine Co.*

Turn the page

KEEP FLOORS SAFE AND CLEAN WITH EASE AND ECONOMY

FLORCO®

Florco is the most effective, practical and economical adsorbent for the maintenance of dry, safe, non-slip floors, decks and all porous surfaces.

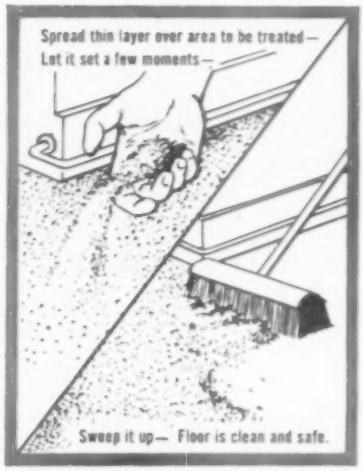
Florco combines high adsorption capacity with physical strength; it is one of the few materials of its type to meet Armed Forces specifications and be approved by the Underwriters' Laboratories, Inc.

Florco's unique adsorptive properties prevent "bleeding" of adsorbed liquids and materials to cleaned surfaces.

Florco contains less "micro-dust" than any other similar material.

Florco is safe to use on all types of surfaces, creates no health hazard, is non-flammable, provides a rough non-skid surface upon which it is safe to walk and work.

Florco usage does not require special costly applicators or removal equipment.



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- **Equipped with antenna, battery, microphone, speaker or earphone.**

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Have happier workers and a happier boss both achieved by use of FAIRBANKS COST-CUTTER TRUCKS!

Just think of trucks as tools. Then you instantly recognize that the right trucks must make lighter work of materials handling. Your men with the right tool—the right truck—do more with less effort and with *greater safety*. You realize surprisingly large time and cost savings. Select your COST-CUTTER Truck now from Fairbanks complete line of Two Wheel and Platform Hand Trucks. Always specify Fairbanks Trucks for the rugged construction and smoother operation that brings added savings in long-lasting dependable service. Fairbanks Trucks are available from leading distributors in all the principal cities.

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Fairbanks "Bantamweight" Platform Trucks
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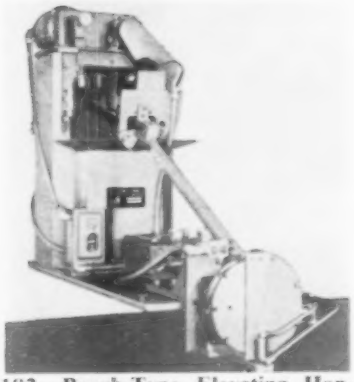
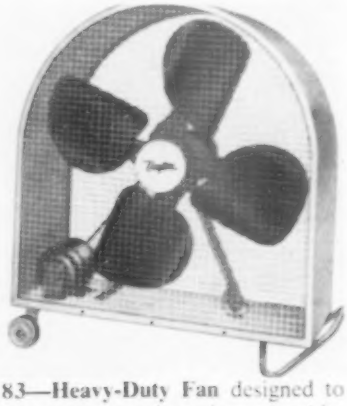
FACTORY / EQUIPMENT NEWS

Begins on page 128

For more about these items, circle item numbers on Reader Service Card next to back cover.



182—Bench-Type Elevating Hopper handles varied-size metal and non-metal parts—rolling forms to 1-in. dia., 5/8-in. long; sliding and headed forms to 1/2-in. dia., 1 3/4 in. long. Needs only simple adjustment in chuting to change products. *Production Feeder Corp.*



183—Heavy-Duty Fan designed to cool a group of workers provides all-around protection with its sturdy steel frame and closely woven wire finger guard. The 36-in. blade delivers up to 13,000 cfm. Rubber wheels provide easy mobility. *Dayton Electric Mfg. Co.*

184—"Carloader 4024-S" is a 4000-lb.-capacity, solid-tire fork truck with a wheelbase of only 40 in. It's designed to load and unload boxcars and trucks, to operate in low-stacking areas. Lift speed is 30 fpm. loaded; forward speed, 7.4 mph. *Clark Equipment Co.*

Turn the page

A-W Hydraulic Crane handling 3-ton pallet of strip steel in storage yard of Superior Tube Company, Collegeville, Pa.

Speedy Austin-Western Hydraulic Crane cuts materials handling costs at Superior Tube

Two years ago, Superior Tube Company, Collegeville, Pa., "The Big Name in Small Tubing," bought an A-W Hydraulic Crane primarily to handle strip coils, steel billets and box lumber.

Elmer W. Maul, shop foreman, reports: "We formerly had to unload the strip coils from trucks by hand, a tough, backbreaking job that took six men 5 or 6 hours to do. Each truckload of coils weighed about 30 tons, with the individual pallets running about 3 tons. To reduce handling, the coils were stored inside the building in a 1200 sq. ft. area, where an overhead crane could deliver them for fabrication.

"Using the A-W crane, two men can now unload a truck in an hour, and the coils can be stored outside, giving us this inside storage area for other purposes. As the coils are needed, the A-W picks them up, and takes them inside for delivery by the overhead crane.

"In the past, we had our steel billets shipped in by rail. They arrived at a spur about 1¼ miles from the storage area, and it took a full day to unload a gondola with a truck crane renting for $60. We now get shipments by truck which can be unloaded by the A-W in only 3 hours. Furthermore, the crane has enabled us to double our storage capacity without increasing the area by the use of stacked storage bins for various sizes of billets.

"Box lumber was also shipped in by rail. To unload and store this, we rented a truck crane at a flat rate of $225 for the 16-hour job. Today we have it brought in by truck, and the A-W unloads and stores it in an hour.

"We are constantly finding new uses for our A-W crane. It has served us well wherever there is a job that needs muscle, and we consider it an excellent investment."

The A-W crane can speed your materials handling and save you money. There is a representative nearby who will gladly arrange a demonstration and show you how. Get in touch with him today . . . or write direct.

Austin-Western CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

For more facts circle 569 on Reader Service Card

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RIDGID

number for drop-head pipe dies unequaled for easy work, good threads and extra long service!

No wonder pipe "pros" have bought hundreds of thousands of them, the easy way they snap into the ratchet ring handle . . . the smooth clean way they cut ⅛" to 1" threads . . . the quick way the dies reverse for close-to-wall threads. You'll like OOR's, too—get 'em at your Supply House.

The Ridge Tool Company, Elyria, Ohio, U.S.A.

FACTORY / EQUIPMENT NEWS

Begins on page 128

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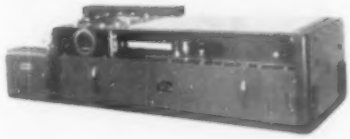
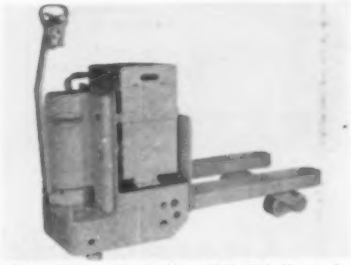


185—Belt (Steam) Weigher known as Pneu-Weigh is useful for continuous process industries. Measures and controls flow of dry materials at low to medium rates from 0 to 3000 lb. per min.; operates over a 10:1 range which can be converted to 50:1. *Omega Machine Co.*



186—Electric Pallet "Walkie" packs maximum strength in minimum space. It handles 15,000-lb. loads on 52x52 in. pallets; is only 32¾ in. wide, 72¼ in. long over-all. Forks are 5 in. high in low position, have a 5½-in. lift. *Automatic Transportation Co.*

187—Electro-Magnetic Disk Brake for use with electric motors offers torque ranges to 7500 ft.-lb. intermittent duty, 4200 ft.-lb. continuous duty. Style "DM" brake is spring-set, magnetically released; mounted wherever required in equipment. *Stearns Electric Corp.*

188—Testing Kit for all types of portable gas indicators in the field assures accuracy of readings. Method uses a known percentage mixture of methane and air for checking readings. Kit complete with 24 ampoules of methane costs $5. *Johnson-Williams, Inc.*

Turn the page

TOKHEIM High-Vacuum

HAND PUMPS

for industrial liquids

Here's an all 'round utility pump that saves much more than its cost in speeding production, improving housekeeping, preventing waste. Eliminates slippery floors and liquid accumulation so often the cause of fire and accidents. Delivers 20 gallons per 100 back and forth strokes. Pumps oil and many other liquids. (Write for approved list.) Has hose or spout outlet. Call your dealer, your Tokheim representative, or write factory.

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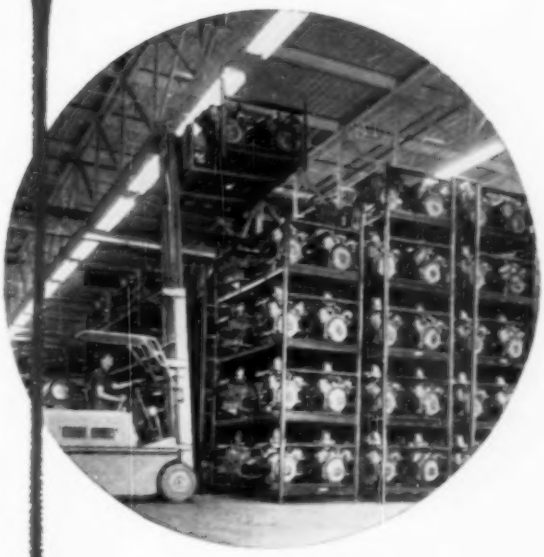

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METAL WORKING FACILITIES
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CARD HOLDERS

TRAYS

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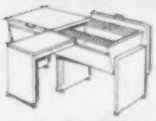
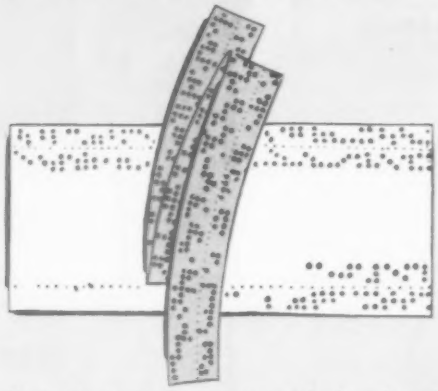

EXPANDER CABINETS

Ask the man from Acme to show you samples

ACME VISIBLE

speeds the availability of source material provides accessible filing of the products of

AUTOMATION



Electronic machines produce punched cards and tapes at astounding speed. Once punched many become permanent records to be used over and over again. Acme Visible Records and equipment provide for filing and fast finding, with SEEABLE indexing that speeds the handling of this material to keep pace with the machines.

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Crozet, Virginia

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(Approx. number of records) _____

☐ Have representative call. Date _____ Time _____

Company _____

Attention _____

Address _____

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Begins on page 128

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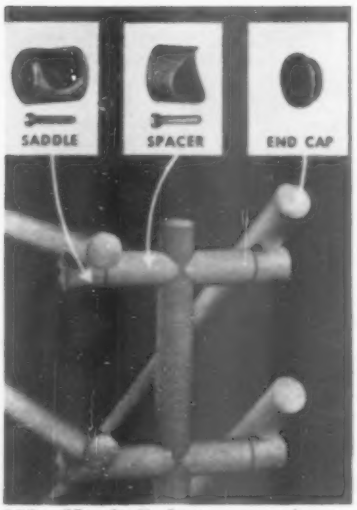
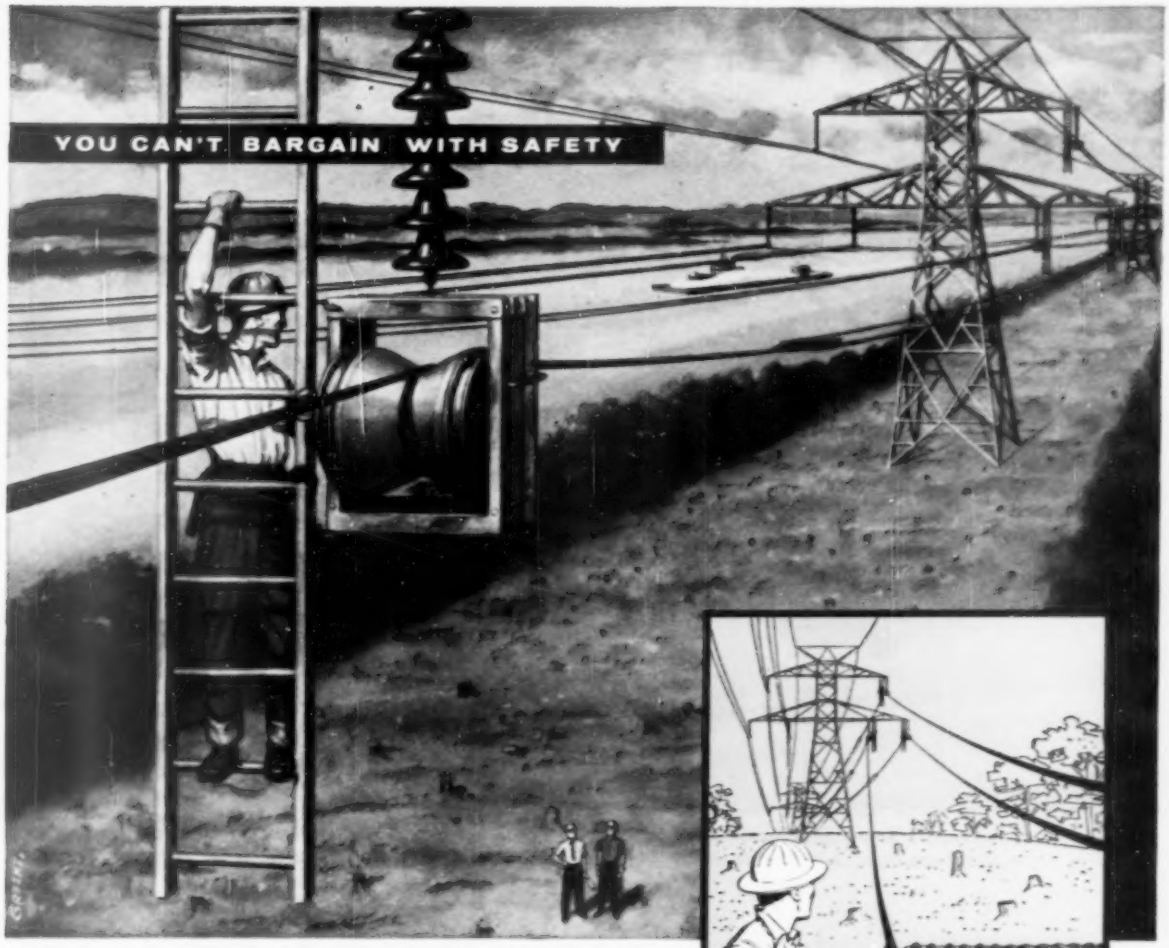


189—Handrail System can be assembled without welding, without waste or scrap. Involved are only four basic parts: saddle, spacer, end cap, and two screws. One man can install railings on-the-spot, using only a hacksaw, drill, and screwdriver. *Universal Railing Co.*

190—Double-Acting Air Cylinders are 4 models in 4 sizes; they are horizontal, vertical, pivot, or face-mounted, and the bores are 1½, 2½, 3¼, and 4 in. All models are built for 250-psi. working pressure; have internal cushioning at both ends. *Mead Specialties Co.*



Stringing conductors on towers carrying a live 330,000 volt circuit is a tough job. Hoosier Engineering Company of Columbus, Ohio, does it by threading conductors up to 1¾" through a tension machine and pulling them over sheaves on the tower arms with 9000 foot lengths of Wickwire Wire Rope. On jobs like this, where men's lives are at stake . . .

rope failure can be fatal

Whether you're stringing power lines, pulling drill pipe, or handling other hazardous hoisting jobs—don't bargain with safety. "Bargain" wire rope can cause more trouble and expense than you expect. Buy wire rope on the basis of *quality* . . . buy Wickwire Rope.

For extra strength—buy Wickwire's Double Gray IWRC extra improved plow steel wire rope

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WICKWIRE ROPE
A CF&I PRODUCT

LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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5924

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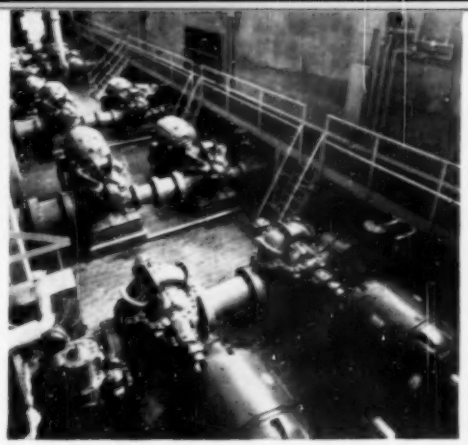
SUPERVISORY CONTROL

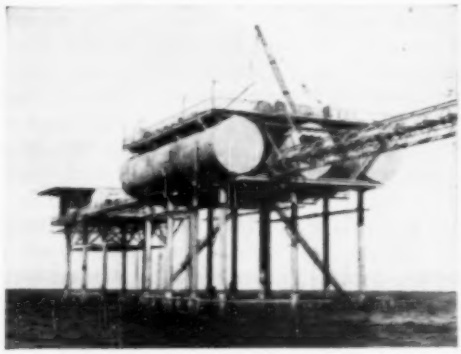
In industrial power distribution applications, all circuit breakers in load centers (B) are controlled from supervisory master station (A) with installation of only two interconnecting wires.

This supervisory master station panel includes telemetering equipment, is designed to control up to 56 different pieces of apparatus.

Compact remote station panels can be equipped with switch to permit local control.



Water system valves, pump motors are controlled remotely by G-E Supervisory Control System.



Phillips Petroleum controls offshore production from master station on this storage platform.

Buffalo office building uses supervisory to control power distribution system.

From power distribution to valve operation, you simplify and centralize remote control with General Electric Supervisory Equipment

General Electric Code-selector Supervisory Equipment simplifies and centralizes remote control of any piece of apparatus that is equipped for electrically operated local control. It can open and close switches and valves, adjust speed, voltage or loads, and control your power distribution system . . . and do it more economically than comparable direct-wire systems. With the addition of high-speed telemetering, supervisory can also provide an operator with the equivalent of local instrumentation for measurement of pressures, flows and voltages.

Supervisory control has been very successfully applied to complex remote operations by the petroleum and electric utility industries. Now, many other industries are finding it applicable to their remote control needs. To find out if it fits your system, call your General Electric Apparatus Sales Office, or fill out the coupon at right.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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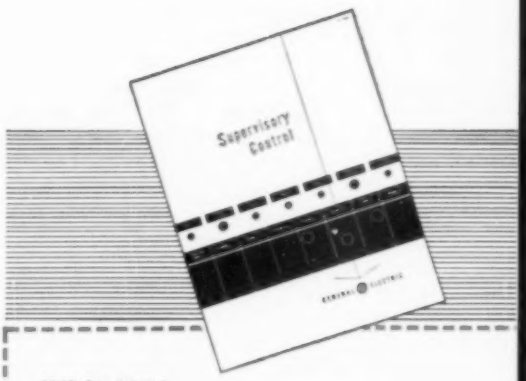

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FACTORY
MANAGEMENT AND MAINTENANCE

LABOR RELATIONS NEWS

By PAUL A. KING, Attorney, Bigelow-Sanford Carpet Company, Inc., Member, New York Bar

Must Supply Timestudy Data for Union

Produce such data in depth, says Court—and as union needs to police the contract. Makes no difference if contract negotiations are a long way off.

By now, most employers are willing to concede that at negotiation time unions are entitled to certain data developed by or in the hands of the employer. But the courts have gone further and have given unions the right to that kind of data *during the contract year*. The underlying theory in the view of a United States Court of Appeals, which has given the most recent ruling on the subject, is as follows:

"The contention that the union's right to data is limited to the pending wage negotiations overlooks the fact that collective bargaining is a continuing process which involves day-to-day adjustments in the contract and other working rules, resolution of new problems not covered by existing agreements and the protection of employee rights that are already secured by contract.

"The union not only has the duty to negotiate collective bargaining agreements, but it also has the statutory obligation to police and administer the existing agreements."

J. I. Case Company had a two-year contract with Local 806 of the International Union of Automobile and Agricultural Implement Workers of America, AFL-CIO. Under the contract, Case had the right to set up piece rates using the timestudy or any other customary method. However, the union had the right to review the rates set up if there were an important change in the job. And if they did not find the rates to their liking they could grieve.

The company changed a single machine operation to a two-machine job without changing the rate of pay. The union than asked for this data: The timestudies on the job as a two-machine job and a one-machine job and the various criteria used by the company in setting a job evaluation of the two-machine job. The union later asked for timestudy data used in setting up rules for all jobs in the particular plant and the data used for the tractor line jobs in another plant.

The company resisted for these reasons: The requests were not made in good faith for purposes of collective bargaining. The requested data pertained neither to a pending grievance nor to a request for negotiation under the contract. Production of the data would be unwarrantly burdensome. The information had not been used by the company during union negotiations but was for internal management purposes only.

As indicated earlier, the court ruled in favor of the union. The data requested as to particular jobs were required to permit the union to decide to file or not to file grievances. The information as to all jobs would aid the union in preparing for negotiation of a new contract. Finally, the difficulty of furnishing the information is not relevant. Just because the company is large, with a complicated wage structure, is no excuse for not furnishing the union with data it was entitled to have. Some arrangement could have been worked out—thus held the court.

The National Labor Relations Board and the courts look at the facts of each case to determine whether there is a relevancy between the information requested by the union and its actual need. Pure fishing expeditions are not countenanced. In this case it was adjudged the union needed the data to police the contract.

Pension Payments for All

This restaurant owner was required by contract to pay 8¢ per hour into a health, welfare, and retirement fund "for each hour worked," "or any time paid for" by his employees. That doesn't require him to kick in money for hours worked by *non-union* employees, he argued. They're temporary, he further argued. A lower California court agreed with him. The California appeal court didn't. Ordered him to pay up.

The union is the bargaining agent for all employees, the over-ruling court reasoned. Besides, temporary employees may become permanent ones.

Warn of Insurance Changes

The master contract between you and the insurance company is the basis of your company's group life insurance coverage. Each employee is given a certificate and a booklet. The question that haunts personnel men (and it's hard for them to get a straight answer) is this. Can the company change the program without notice to individual employees? Yes *and* No!

In this case interpreted under New York law the answer was *No*. Before the employee in question died, the insurance contract was changed to shorten the period of life insurance coverage after termination of employment. The deceased's beneficiary would have received the proceeds under the former provision. Not under the amendment. The printed contract read "Termination of this policy or amendments thereto shall not

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A cinch with Sanax

It waxes as it cleans!

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Sanax was developed to permit frequent cleaning of waxed floors *without washing away the finish* . . . and to eliminate waste in wax and labor. A neutral liquid soap with a wax base, *Sanax* not only quickly removes dirt, oil, and grease, but *leaves a thin film of wax*. In fact, regular use of *Sanax* to machine-scrub or damp-mop waxed floors *actually prolongs the life of the finish*, and thereby reduces refinishing costs on a year-to-year basis.

Like all *Finnell Fast-Acting Cleansers*, *Sanax* is specially designed for the greater speed of machine-scrubbing, and works as effectually in a *Combination Scrubber-Vac* as in a *Conventional Scrubber-Polisher*. And because *Sanax* is processed from pure vegetable oils, it's *safe for all floors*.

Find out how you can simplify and reduce the cost of caring for waxed floors. *There's a Finnell Floor Specialist nearby* to help you choose the waxes and cleansers that are *exactly right for your needs*. *Finnell* makes a complete line, so you can depend on unbiased advice. In fact, *Finnell makes everything for floor care!* For consultation, demonstration, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2506 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

- A mild liquid wax-soap for machine-scrubbing or damp-mopping waxed floors
- Leaves a lustrous anti-skid protective finish
- Highly concentrated . . . economical to use

FINNELL SYSTEM, INC.

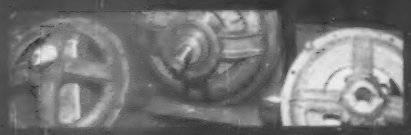
Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

For more facts circle 656 on Reader Service Card

R. L. Kirkpatrick* says . . .



POWER-UP!

calls for modern

maintenance

EFFICIENT ECONOMICAL GUARANTEED

J-95188-R

*MANAGER, MAINTENANCE SALES DEPARTMENT
WESTINGHOUSE ELECTRIC CORPORATION

YOU CAN BE SURE...IF IT'S Westinghouse

Begins on page 192

require the consent of or notice to any employee." But the words "or notice" had been deleted.

From this the court inferred that notice of an amendment was required. Besides which, the conversion period was cut down by the policy change. It was important for the employee to know about this. Important enough, said the court, to make such notice from the employer a requirement.

Suppose the words "or notice" had not been stricken? What would the court have ruled? No telling for sure, but the safe way to play it is to notify employees of all important changes in insurance coverage.

Crisis in American Unionism

For unions the future isn't too rosy, predicted Prof. Edwin E. Witte (Chairman of the Department of Economics, University of Wisconsin) at a conference of arbitrators. He saw signs of a "crisis in American unionism." They are:

. . . *Layoff* of 100 AFL-CIO organizers. That's one-third of the staff.

. . . *Union membership* has not increased as expected after the AFL-CIO merger.

. . . *Current economic recession.* Union membership decreases in recession.

. . . *More women workers.* More married women workers. Harder to organize.

. . . *Workers in suburbs.* They're more likely to resist organization.

. . . *Increased worker income* levels makes organization tougher.

. . . *Current stronger anti-union* attitude of public.

. . . *Likelihood* of anti-union legislation.

Don't Post Temporary Jobs

An employee gets sick, or wants a short leave of absence. Do you have to go through the contract job-posting procedure to fill such temporary vacancies?

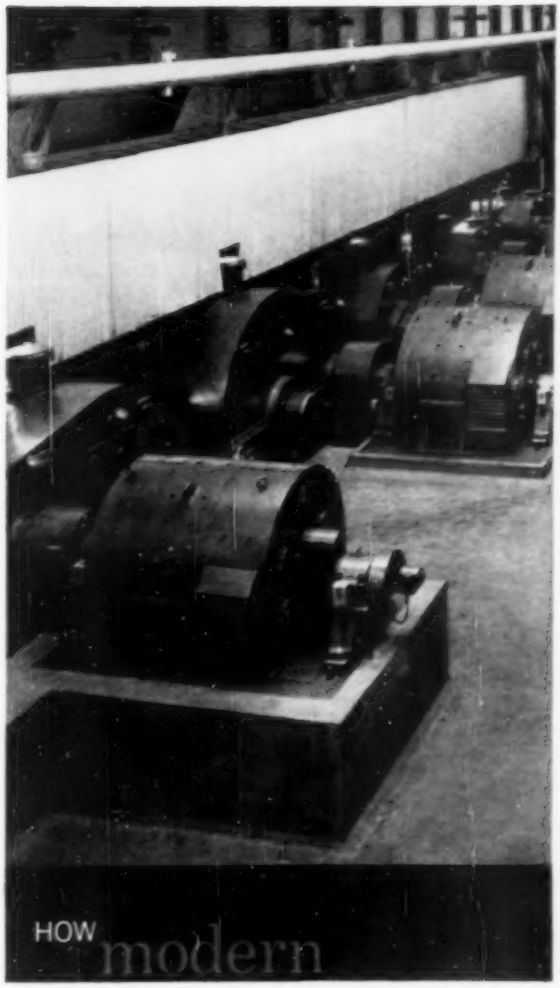
No, said one arbitrator. Even where the contract does not distinguish between filling temporary and permanent vacancies, the elaborate procedure need not be followed for temporary openings.

Of course, it's safer to have the issue spelled out in contract language. Many contracts don't have the distinguishing words.

No Safety Hat for This Worker

Wearing safety hats is often a pain in the head. Leastwise one bricklayer found it that way. So he refused to wear his safety hat, thus violated a rule of the company. The company disqualified this headache-ridden employee from his bricklaying job. Reason: physical condition.

The rule was not reasonable, said the arbitrator. Why? Other workers—not bricklayers—working along-



engineering service

STOPS MILL MOTOR FAILURE

PROBLEM — A major steel producer found they had to expand their preventive maintenance inspections of mill motors or face possible equipment breakdown.

SOLUTION — They consulted with their Westinghouse salesman and discovered that they could have their mill motors inspected and maintained more economically on a scheduled basis by Westinghouse Engineering Field Service.

RESULT — No down time from mill motor failure in over two years. Find out more about Preventive Maintenance Inspection service today; call your Westinghouse salesman or write: Westinghouse Electric Corporation, Box 868, 3 Gateway Center, Pittsburgh 30, Pa. J-95193

YOU CAN BE SURE...IF IT'S Westinghouse

For more facts circle 576 on Reader Service Card

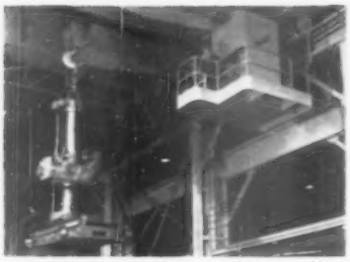
Crane control so exact you can polish your car

Polishing a $5,000 Mercedes-Benz with a cloth on a crane hook takes perfect control. Foolish idea? Not really. Your products and equipment are worth far more than a quality car. Whatever you lift, total control is better with a "Shaw-Box" crane.

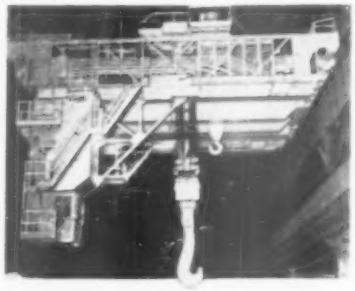
Exact control of all crane operations is engineered into every "Shaw-Box" crane. For instance, bridge end trucks have enclosed gearing to keep grease off the runway, to prevent whipping and skewing. Wheel traction is uniform, starts and stops fully controlled.

Shaw-Box builds cranes to your requirements, to AISE specs, and standard models; to lift 1 ton or 500; for stand-by, intermittent or continuous duty. Every one with absolute control of travel, traverse, lifting and lowering

Ask one of our engineers to call for a discussion of your crane needs and how Shaw-Box can satisfy them on every count.



Shaw-Box builds all types of cranes. Many construction and operational advantages now accepted as standard were introduced by Shaw-Box.



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"Shaw-Box" CRANES

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

358 W. Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, and 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

Begins on page 192

side were *not* required to wear safety hats. The employee was reinstated.

The union contract gave the employer the right to make reasonable rules, but this rule—being applied as it was—was not reasonable.

Labor Injunction Upheld

These days when manufacturers are struggling hard to keep in the black, unauthorized work stoppages and slowdowns become more serious. The contracts of some of the New York City breweries have a clause calculated to bring work stoppages and slowdowns to a speedier halt. Such cases must go to arbitration within 24 hours of a complaint. The arbitrator must hand down his award within 48 hours after the hearing. Since leisurely selection of an arbitrator is not in the cards under such a clause, the breweries subscribing to this plan have selected a panel of five arbitrators in advance. They may be called on a rotating basis. If one happens to be out of town when needed, another may be called.

This clause, however, almost met an untimely end when arbitrator Theodore Kheel ordered some members of the Teamsters Brewery Workers who were slowing down production to get up to normal pace and stop dragging their feet.

The union didn't take to the award. Brought it before the New York courts on the ground that Kheel's injunction order violated the state ban against issuance of labor injunctions.

This prohibition doesn't apply to arbitrators, ruled the Court of Appeals, New York's highest court. It only applies to courts! In agreeing to arbitration, the parties themselves authorized the issuance of this kind of award.

This case will bear importantly on the law of other states.

Strikers Go Unpunished

In employee relations, it is not always true that you can't get into trouble if you keep your mouth shut. Bethlehem Steel lost out when it adhered to a tight lip policy.

A group of its employees walked out over incentive rates. A shop steward and a former union president were then fired. Reason: Their participation in a wildcat strike violated the contract. That was all they were told at that time.

But when the grievance reached the third step, Bethlehem amplified its reasons. When the former union president held office, there were 58 authorized strikes. Both shop steward and former president had important jobs. Both were influential union members. Both had been previously warned about their wildcat strike proclivities.

Good enough reasons, granted the arbitrator, but too late to do Bethlehem any good. Company should

HOW modern apparatus repair

UPRATES DISTRIBUTION TRANSFORMERS

PROBLEM — An electric utility had to have more distribution transformer capacity to meet increasing load requirements.

SOLUTION — Westinghouse determined that many of the 7½ and 10 kva transformers in use had tanks of sufficient size to accommodate Westinghouse-designed 15 kva core and coil assemblies.

RESULT — Transformers were MODERNIZED by installing new 15 kva core and coil assemblies and bushings to give the needed load capacity.

Ask about Westinghouse repair plant facilities that are available for the repair, uprating and modernization of distribution and power transformers. Call your Westinghouse salesman or write: Westinghouse Electric Corporation, Box 868, 3 Gateway Center, Pittsburgh 30, Penna.

J-95192-A

**This easily identified rating decal is added to all rebuilt transformers on request.*

YOU CAN BE SURE...IF IT'S
Westinghouse

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This plant costs less to operate because Dracco Dust Control protects product purity and avoids serious clean-up problem. Binney & Smith, Inc., manufacturers of nationally known "Gold Medal Crayola® Crayons", selected a Dracco system to collect organic pigment dusts from production units (below).

Uncontrolled dust in your plant can impair employee health or working efficiency, shorten machine life, contaminate critical materials, cause excessive plant clean-up and maintenance costs and disrupt community relations.

You can trap dust at its source, and eliminate its nuisance, irritating, toxic or abrasive effects—with Dracco Dust Control Equipment. Men and machines work better in clean, pleasant surroundings. Absence of dirt and corrosion keeps maintenance costs lower.

If dust is sapping your profits by causing production slowdowns, downtime and personal discomfort, take positive action. Call or write Dracco today.

DRACCO DIVISION OF FULLER CO.

4075 East 116th Street • Cleveland 5, Ohio

HERE'S HOW TO REDUCE COSTS WITH DRACCO DUST CONTROL:

- Eliminate health and safety hazards by stopping spread of toxic dust
- Lengthen machine life by preventing abrasive wear
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- Cut plant housekeeping costs by eliminating clean-up problems
- Improve community relations by halting air pollution

Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY

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Begins on page 192

have presented them at the predischarge hearing when employees could have countered with evidence. Not being able to consider these later advanced reasons, the arbitrator reinstated the employees. They were no more guilty than the other strikers.

As a rule, arbitrators will permit discrimination in disciplining union officers for wildcat striking. But some contracts have a provision against this.

* * *

Ethics for college recruiters. There's good news for the "sincere" company that wishes to compete with larger, more aggressive, and better endowed companies for this summer's crop of college graduates. College placement associations and business representatives have agreed upon a code of ethics to be followed in the recruiting of graduates. Copies of the Code, called *Principles and Practices of College Recruiting*, can be obtained (25¢) from U.S. Chamber of Commerce, 1615 H. Street, N. W. Washington 6.

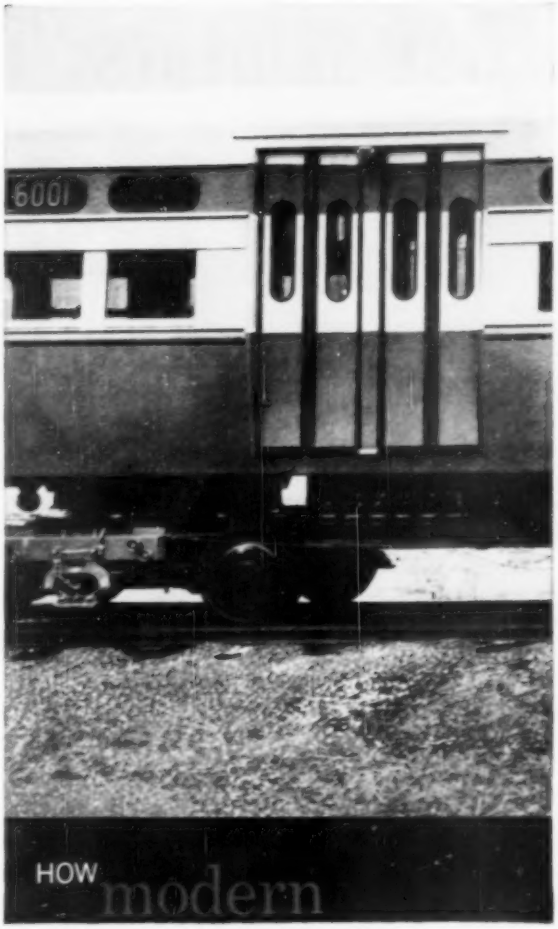
Handling unfair labor practices charges. If you expect to be involved in an unfair labor practice case, take a look at the article on "Unfair Labor Practice Proceedings Before The National Labor Relations Board" in the February 1958 issue of the *Shingle* put out by the Philadelphia Bar Association. Sending 25 cents to the Association at 600 City Hall, Philadelphia, will put the issue in your mail box.

Profits made in last minutes. Food Machinery and Chemical Corporation hit upon a dramatic way to show this profit-picture: in terms of time worked. In the normal 8-hour day, it wrote to workers, the company made its profit in only the last 19 minutes. Until that time all mark-up on goods sold is allocated to expense of production, taxes, and so on.

Index of retirement booklets. *Planning Your Retirement* contains the titles of 43 government booklets dealing with health, hobbies, Social Security, and so on. It's free from the Government Printing Office, Washington 25, D. C.

Just a spectator. This doesn't happen often: During a hearing of an unfair labor practice charge against an employer, the NLRB Trial Examiner suggested that the parties negotiate their differences. They did and the Examiner sat in on one of the sessions. The employer demanded a dismissal of the unfair practice charge on the grounds that an examiner is not permitted, under the Taft-Hartley Act, to conciliate or mediate a case. The Board ruled that this examiner did neither. He didn't participate in the negotiations.

Striker! Drop that Brownie! Cameras are useful—personally and in industry—but they can't be used by pickets to photograph customers and employees. Such picketing is illegal. May be enjoined, rules a Kansas court. Implies a threat of violence to those who have been snapped.



renewal parts

HEAD-OFF TRANSIT BREAKDOWN

PROBLEM — Like many industrial users of electrical apparatus, this transit system's equipment was out of service excessively because of electrical failure.

SOLUTION — Westinghouse and transit engineers traced this electrical equipment failure to replacement parts made to tolerances not specified by original equipment manufacturers.

RESULT — By using genuine renewal parts, this equipment is operating like new. Westinghouse can also help you with your industrial equipment. Call your Westinghouse salesman or write: Westinghouse Electric Corporation, Box 868, 3 Gateway Center, Pittsburgh 30, Pa. J-95194

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Get painters "in-and-out" fast!

The DeVilbiss spray method is at least four times faster than brush; lets you repaint at night or over a weekend without costly work stoppages.

DeVilbiss spray method speeds painting; coats all surfaces up to 4 times faster than brush!

If you find that painters "stay underfoot too long," request they use the DeVilbiss spray method next time you repaint your plant.

DeVilbiss spray takes only one-fourth the time that brushing does. And you get a better paint job in the bargain.

You see, with DeVilbiss spray, there's no time-consuming dipping, stroking, wiping, bending, or stooping. All materials are handled equally well, from protective, decorative to sound-deadening and fireproofing.

And you can paint steel, brick, stucco, stone, or wood with a full-covering coat of any thickness—and usually only one coat is needed!

Lightweight, versatile DeVilbiss Tuffy Spray Outfit includes gun, 1-qt. cup, 12-ft. hose, portable compressor; atomizes even heavy-bodied materials.

DeVilbiss Tuffy Outfit makes quick work of radiators, grilles, and other tedious jobs

Painting irregular surfaces is ordinarily a painstaking, time-robbing task. And results are too often inadequate.

The answer? A low-cost DeVilbiss Tuffy Spray Outfit! It does that trim and finish-up work in a matter of minutes. Gets fully covering coats into deep recesses without daubing and poking. Paints odd shapes, gratings, decorative moldings, and grilles without leaving skips or filling in finely detailed surfaces—takes the high cost *out* of those tedious jobs.

Your DeVilbiss supplier has details on Tuffy Outfits, as well as paint heaters, spray guns, air compressors, paint pumps and tanks, hose, connections, and accessories. Call him, today!

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preventive maintenance
INCREASED CAPACITY 25%

PROBLEM
An electric utility needed additional capacity. Existing three generators were 50 years old and had to remain in normal service to supply power.

SOLUTION
Westinghouse engineers modernized and uprated the 50-year-old generators from 2000 to 2500 kva through a newly designed split stator wound with Thermalastic® coils.

RESULT
25% increase in capacity with no unscheduled down time due to planned service installations. For modernization of any size motor or generator, consult with your Westinghouse salesman or write: Westinghouse Electric Corporation, P.O. Box 868, Gateway Center, Pittsburgh 30, Pa.

J-95195

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Westinghouse

For more facts circle 576 on Reader Service Card

STRONG

Plywood flooring system boosts load limit in office building

A special flooring system, using stout 1⅛" thick plywood over steel joists helped solve a heavy loading problem encountered when Pacific Telephone and Telegraph Co. decided to mount a battery of huge IBM data processing machines in an older building. Conventional load limits in most office buildings is about 70 lbs. psf. The new plywood floor and specially designed joists boosted the live load rating to the required 200 psf, and permits a concentrated load of up to 1,000 lbs. per machine leg to be transmitted to the floor on large rubber casters resting on steel plates.

DURABLE

Overlaid plywood fume exhaust ducts outlast metal

Switch from metal to overlaid plywood for exhaust manifolds at this giant cellophane plant has sharply reduced maintenance and replacement costs. Installed over four years ago, the ducts have shown no sign of deterioration under continued exposure to sulphuric acid mist, carbon bisulphide, water vapor and other chemical fumes. High density overlaid plywood was used for the manifolds. It has hard, glossy, fused phenolic resin surfaces that are highly resistant to acids and other chemicals. It is virtually impervious to vapor and requires no paint or other protection.

LOW COST

Plywood pallet trays halve labor and storage costs

Fir plywood off-bearing pallet trays in this operation at Myercord Company in Chicago, permit one man to do the work of two and cut storage space in half. The big one-piece pallets are used for storing and handling decals. They're strong, splitproof and light in weight. Previously the company used ¾-inch lumber mounted on 2 x 6 skids with pipe legs to take the weight of individual loads. The bulkier lumber pallets required an additional man at the off-bearing end of the press and consumed twice as much storage space as the new and simple fir plywood pallets.

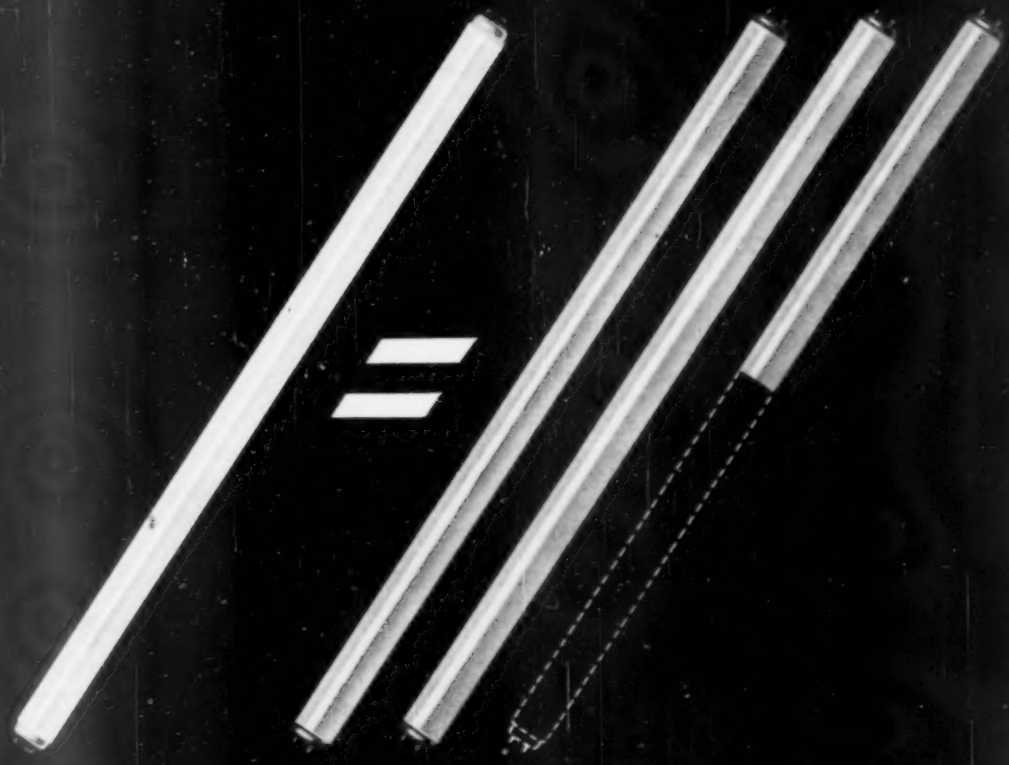
FIR PLYWOOD

DFPA® TESTED QUALITY

Letters DFPA on panel back or edge attest manufacture and inspection under industry-wide quality control program. Individual grade-trademarks are specification guides to the right type and grade and the *right* quality.

FOR INFORMATION about specific plywood uses, or for basic specification-use data, write (USA only) Douglas Fir Plywood Association, Dept. 175, Tacoma 2, Washington.

With no change in tube shape or size, new Sylvania VHO delivers as much light as 2½ standard fluorescent tubes



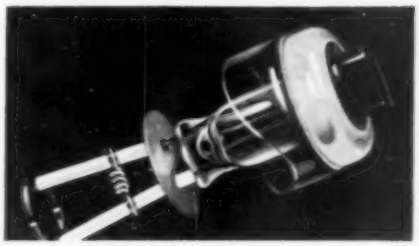
VHO means Very High Output

Another reason why

Sylvania Fluorescents give you more light at lower cost than all other brands

No other very high intensity fluorescents cost so little to buy and use – or maintain greater brightness throughout lamp life. The new VHO fluorescent lamp looks like any standard lamp—yet it delivers more than 2½ times as much light as lamps of identical size and shape. The initial cost of Sylvania VHO is appreciably lower than any other high intensity fluorescent lamps, and at no sacrifice in service or performance. VHO lamps keep operating costs to a minimum by giving you more effective, useful light than other high intensity fluorescent lamps.

SYLVANIA LIGHTING PRODUCTS
Division of Sylvania Electric Products Inc.
60 Boston Street, Salem, Massachusetts



The secret of the VHO is the unique "Pressure Control Center" inside the tube. This exclusive development creates a cooler lamp interior that has enabled Sylvania to pack more than 2½ times as much light into a standard size tube.

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make light a better tool for profits

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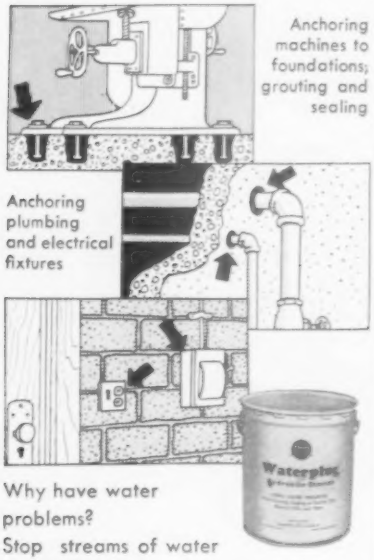
Maintenance and Rehabilitation of Masonry



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FACTORY BOOKS

BY CARROLL W. BOYCE
Manager, Features and Departments
FACTORY

Engineered Work Measurement — Here's an attempt—and a largely successful one—to unify standard time and motion study techniques and a system of predetermined elemental times (in this case, MTM). The result is a book that's a corker for either of two purposes:

. . . *As a basic text* for the relative beginner (not the raw recruit with no previous training) who wants to raise his level of sophistication with respect to both stopwatch timestudy and predetermined elemental times. In the latter connection, it is the first really good book treatment of P.E.T. for methods study, pre-production planning, and cost control and estimating.

. . . *As an up-to-date text* on Methods-Time Measurement for the engineer who wants a complete treatment of this system. The 20 chapters on MTM have been "reviewed by the MTM Association for Standards and Research for conformity with official interpretations and for inclusion of the topics considered essential to adequate MTM training." That may not make this an "official" text on MTM, but in the absence of a revised edition of the Maynard-Stegemerten-Schwab book on MTM (1948), it's the best and most authoritative job available. And the warm endorsement from H. B. Maynard in a special foreword to the book doesn't detract from its standing as the new "standard" reference work on MTM.

By D. W. Karger and F. H. Bayha. The Industrial Press, 93 Worth St., New York 13. 635 pages. $12.

Plant Engineering Practice—Here's a 704-page collection of reprints of articles that have appeared in *Plant Engineering* magazine in the past several years. If you've been reading it over the years, you'll find this a handy "cream of the crop" reference file. If you're a newcomer to the field, you'll find it a good source of practical help and information.

As the editors point out, this is not a handbook. Nor a substitute for one. Despite a clear and useful

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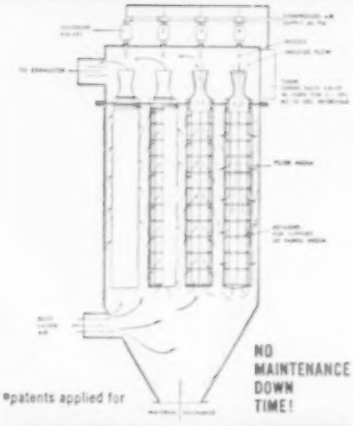

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For additional product information and location of the MIKRO-MAN nearest you, see Chemical Engineering Catalog for 1958, pgs. 1467 to 1474.

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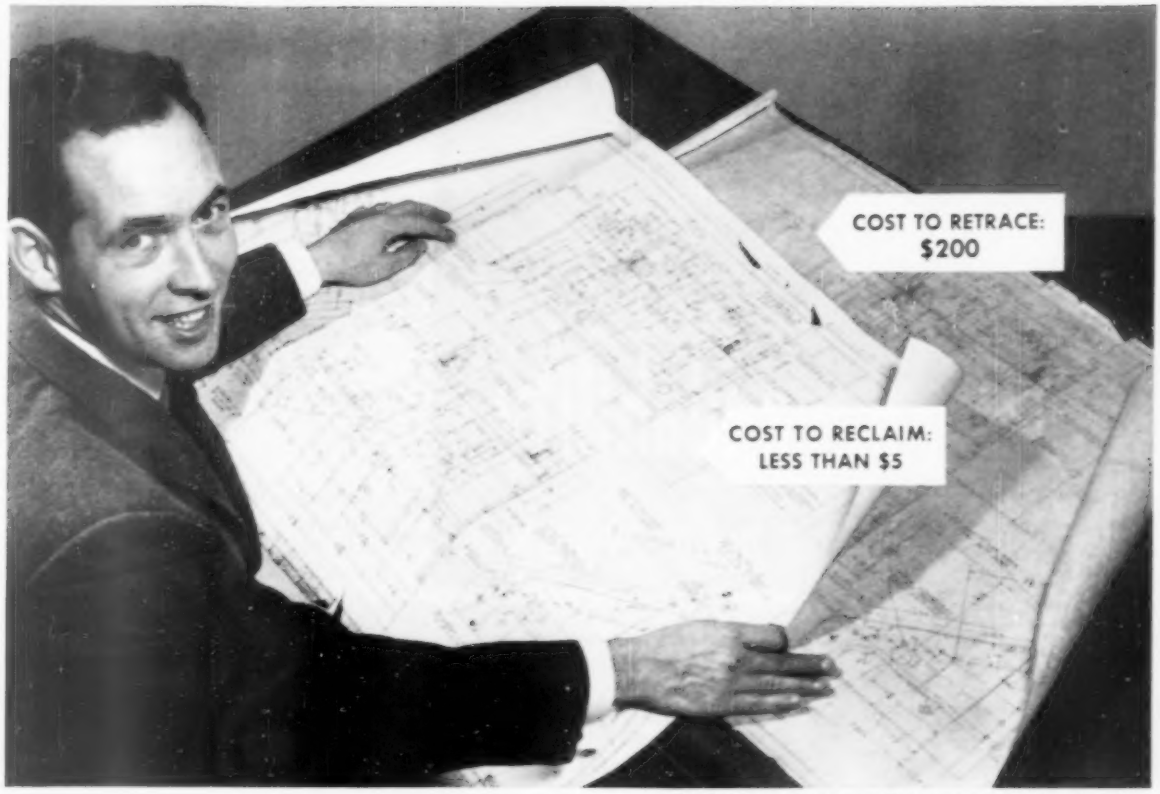

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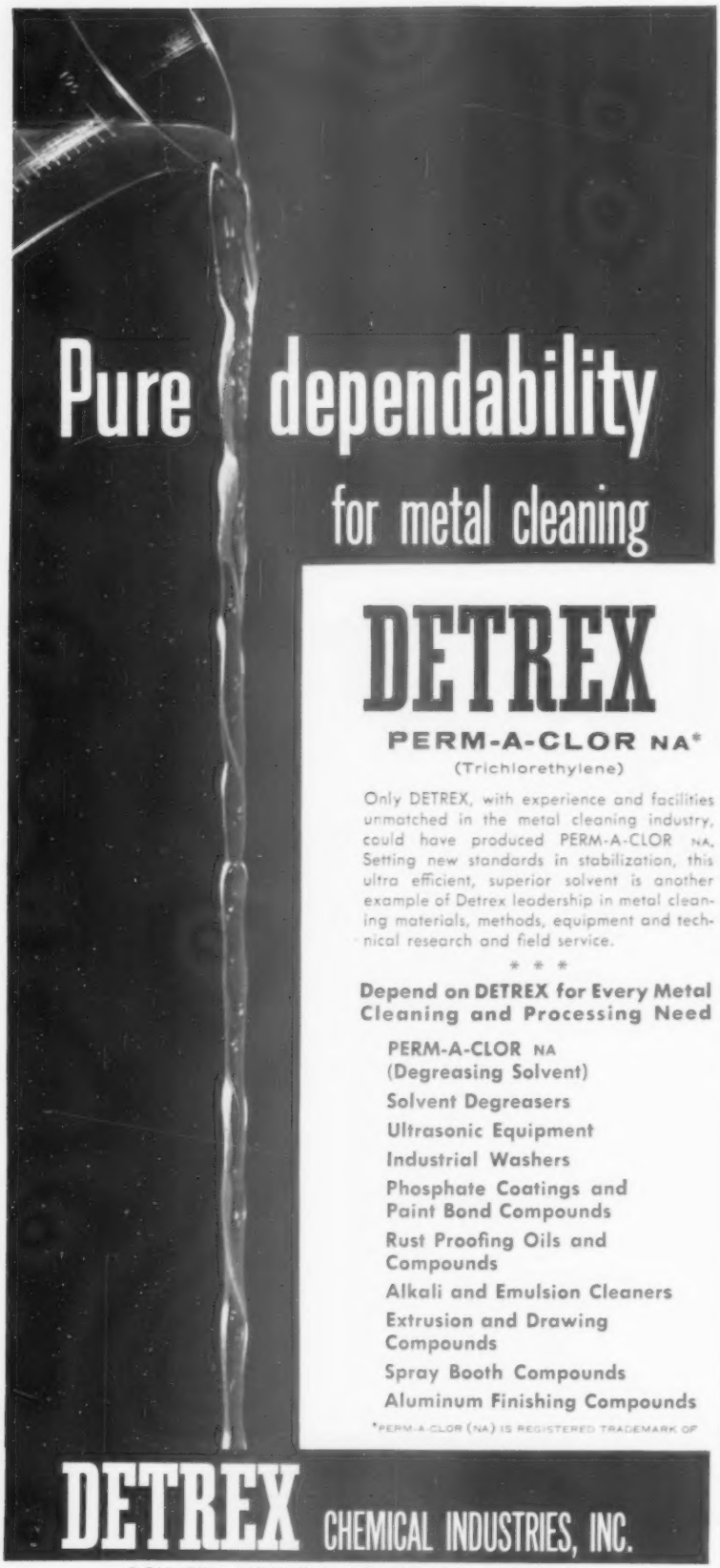


Begins on page 204

organization pattern (13 basic sections), and an excellent index, no collection of reprints can offer the detail or comprehensiveness of a handbook. But the added flavor that comes from case studies and from personal opinion of the authors of the articles makes this a fine companion and supplement to existing handbooks in the field.

By the Editors of Plant Engineering. F. W. Dodge Corp. 119 West 40th St., New York 18. 704 pages. $18.60.

Executive Management of Personnel—This is an engagingly written, fast-reading book version of Edward Schleh's successful top-management "training program." You can't quarrel with the substance of what Schleh is saying; it's a well-organized, lecture-type presentation of sound human relations principles and motivational techniques translated into practical personnel management situations. Trouble is, while a dynamic and clever speaker like Schleh can make this sound new and exciting when he's talking to you personally, in cold print it looks a bit like a collection of platitudes.

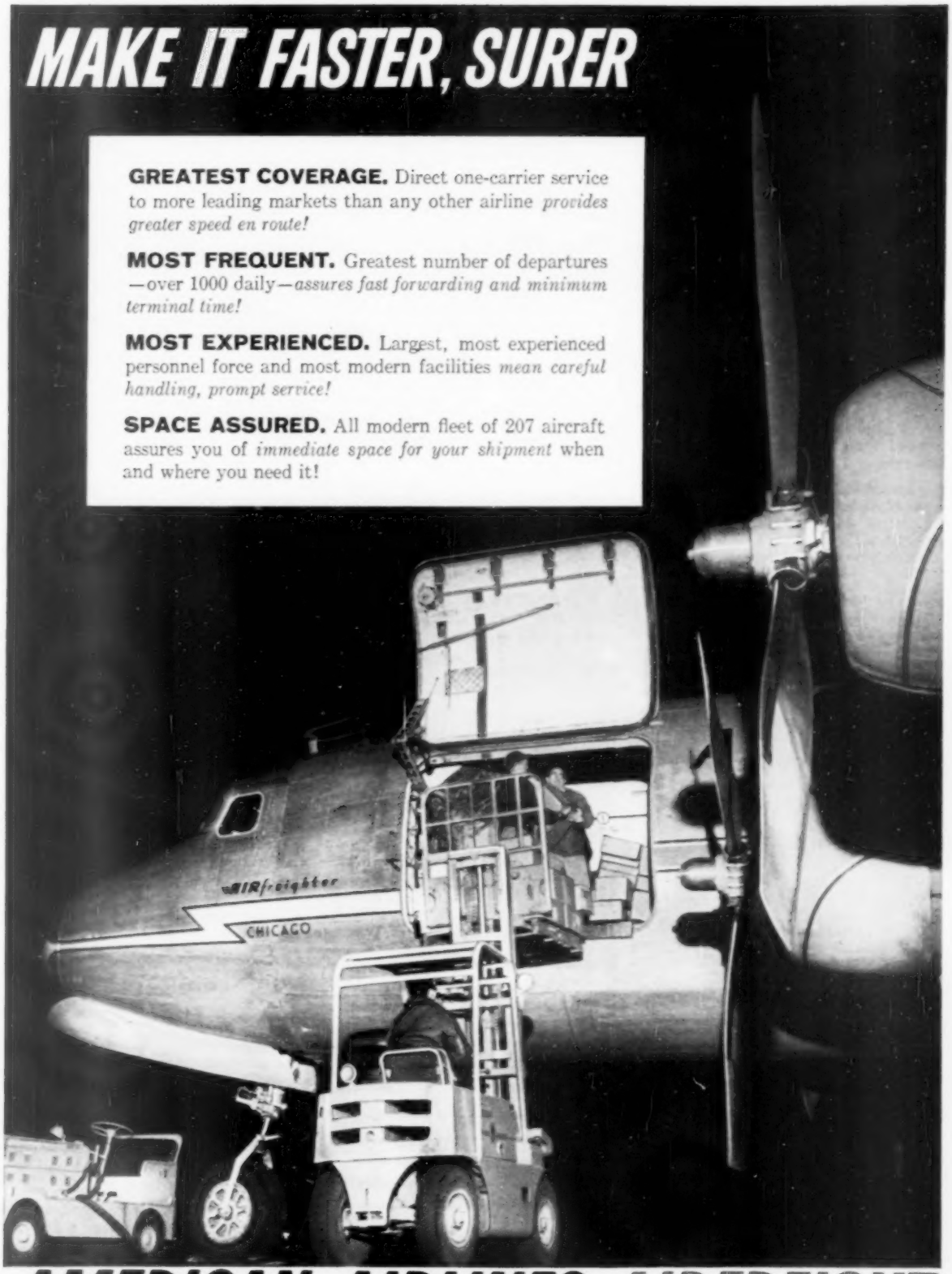
Despite possible shortcomings as "self-improvement" reading matter, this is a top-flight source of ready-to-use material for a training or management development program.

By Edward Schleh. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. 208 pages. $5.65.

Basic Motion Timestudy—Ten years after the publication of Methods-Time Measurement (1948), a complete description of a second system of predetermined elemental times is now available in book form. BMT, as this system is called, isn't new: The authors and their associates in the consulting firm of J. D. Woods & Gordon have been applying BMT for several years—have written articles about it. And there's an excellent section on it in Maynard's Industrial Engineering Handbook.

So, far from being an innovation, BMT is a well-developed, tested system. Naturally, its originators (the authors) and most of its present users believe it superior to "competitive" systems. Now the in-

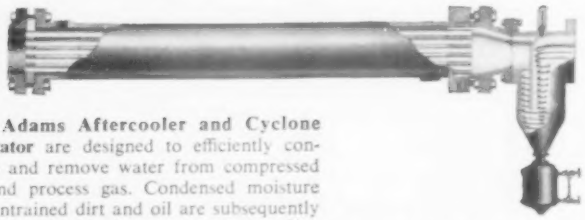
For more facts circle 585 on Reader Service Card



For more facts circle 586 on Reader Service Card

Aftercooler and Cyclone Separator designed for cleaner, dryer compressed air

R. P. ADAMS CO., INC.
215 East Park Drive, Buffalo 17, New York



The Adams Aftercooler and Cyclone Separator are designed to efficiently condense and remove water from compressed air and process gas. Condensed moisture and entrained dirt and oil are subsequently removed in a cyclone type separator. This unit is scientifically designed for maximum removal efficiency over a wide range of flow rates.

For normal use, units are available to cool gases to within 10° F of the temperature of the cooling water. Specially designed units are available to permit a 2° F approach to cooling water temperature, for application where low moisture content is critical.

Adams Aftercoolers and Separators are available from stock to handle 20 - 40,000 cfm with 10° cooling and 25 - 19,200 cfm where it is necessary to cool within 2°F of the cooling water. Special units can be supplied to suit an unlimited range of requirements. In all cases the maximum pressure loss at rated capacities is ½ psi.

This wide range of sizes enables the economical utilization of Adams Aftercoolers and Separators in virtually all industrial application. For further information on how R. P. Adams' units will solve your compressed air problems and save you money, write today for Bulletin 711.

For more facts circle 587 on Reader Service Card

Send for FREE SAMPLE of "SAFETY-WALK"

amazing non-slip surfacing material

MAKE YOUR PLANT SAFER with "SAFETY-WALK": gives perfect traction, sure footing, even under water, oil, or grease! Strips, tiles, cleats, apply in minutes . . . last for years. Four colors . . . easy to keep clean. For stairs, walkways, ramps, indoors and out. Pays off in accident prevention; prevents costly claims; improves employee efficiency.

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SAFETY-WALK BRAND Non-Slip Surfacing

MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW
3M COMPANY

Begins on page 204

dustrial engineer can draw his own conclusion based not on hearsay but on a reading of the book-length expositions of MTM and BMT. (For Work-Factor and Motion-Time Analysis, the chapters in Maynard remain the only extensive descriptions publicly available.)

Complete BMT data are included in the text, as are instructions for their application. Despite a warning by the authors, some industrial engineers will come away from this book feeling that they are fully qualified to apply BMT in the shop; those who jump to this conclusion may have the same sorry experience as the now-wiser men who tried to use MTM after a few hours' study of that book a decade ago.

By Gerald B. Bailey and Ralph Presgrave. McGraw-Hill Book Co., 330 West 42nd St., New York 36. 244 pages. $5.

Applied Statistics for Engineers— With the increasing emphasis on mathematical techniques for analyzing and controlling manufacturing processes, here's a book that deserves reading by most industrial engineers and quality control managers (except the relative few already thoroughly sophisticated in statistical analysis). Don't get scared off by the fact that it's a book in the chemical engineering series—that's just an unfortunate choice by the publisher; concepts discussed are applicable anywhere, and the process-industry background of many of the examples is unobtrusive.

It's a pretty sophisticated book, but anyone with an engineering degree should have little difficulty; you certainly don't need a Ph.D. in mathematics to stay with it. Volk starts in with simple probabilities, works you on through distributions, variance analysis, and correlation-regression analysis, with final chapters on sequential analysis and nonparametric statistics.

By William Volk. McGraw-Hill Book Co., 330 West 42nd St., New York 36. 354 pages. $9.50.

The Worker Views His Union— Here's a study of the attitudes of rank-and-file members of six mid-Western union locals (selected to

For more facts circle 588 on Reader Service Card

Avoid costly down-time caused by electrical control failure....

Nothing is more frustrating to the production man than downtime caused by the failure of a minor component. An $85,000 machine tool down because of a failure of a limit switch can be as expensive as if it were caused by a main bearing burnout. National Acme's electrical controls are designed by machine tool designers and built as machine tools are built. That means extra ruggedness, extra dependability but it does not mean extra cost.

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Oil-tight, water-tight, dust-tight. Built with heavy duty silver alloy contact points, over-size terminal screws, superior dielectric materials. For full information ask for a free copy of Bulletin ECS-56.

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A full line of heavy duty Limit Switches designed originally for machine tool installation but now used wherever extra dependability, extra ruggedness and long life are required. For full information ask for a free copy of our Bulletin EM-51.

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A full line of standard and custom made Solenoids for AC or DC use. Push or pull types with capacities up to 25 lbs. Bulletin EM-52A provides information on the application, design and installation of Solenoids. Write for your free copy today.

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RADIO CORPORATION OF AMERICA
Electron Tube Division **Harrison, N. J.**

Begins on page 204

provide a wide variety of jobs and work situations). The authors—who did their own research—all appear well trained in the techniques of the social sciences.

This report of the attitudes of workers is probably as reliable as any report available; it is based on "depth" interviews rather than on the so-called opinion-poll technique. But it is necessary to remember that no reporter is capable of completely eliminating something of his personality or viewpoint from his analysis of events. The "quotes" in this book, for example, may be representative of the weight of opinion; but the specific ones chosen are still those that appeal to the authors. Recognizing this, you can enjoy an analysis that is penetrating if not 100% scientific.

Until someone some day devises a truly scientific method for measuring attitudes, *The Worker Views His Union* is the next best thing. Must reading if you're interested in developing a feel for basic rank-and-file views.—*George A. Hoy.*

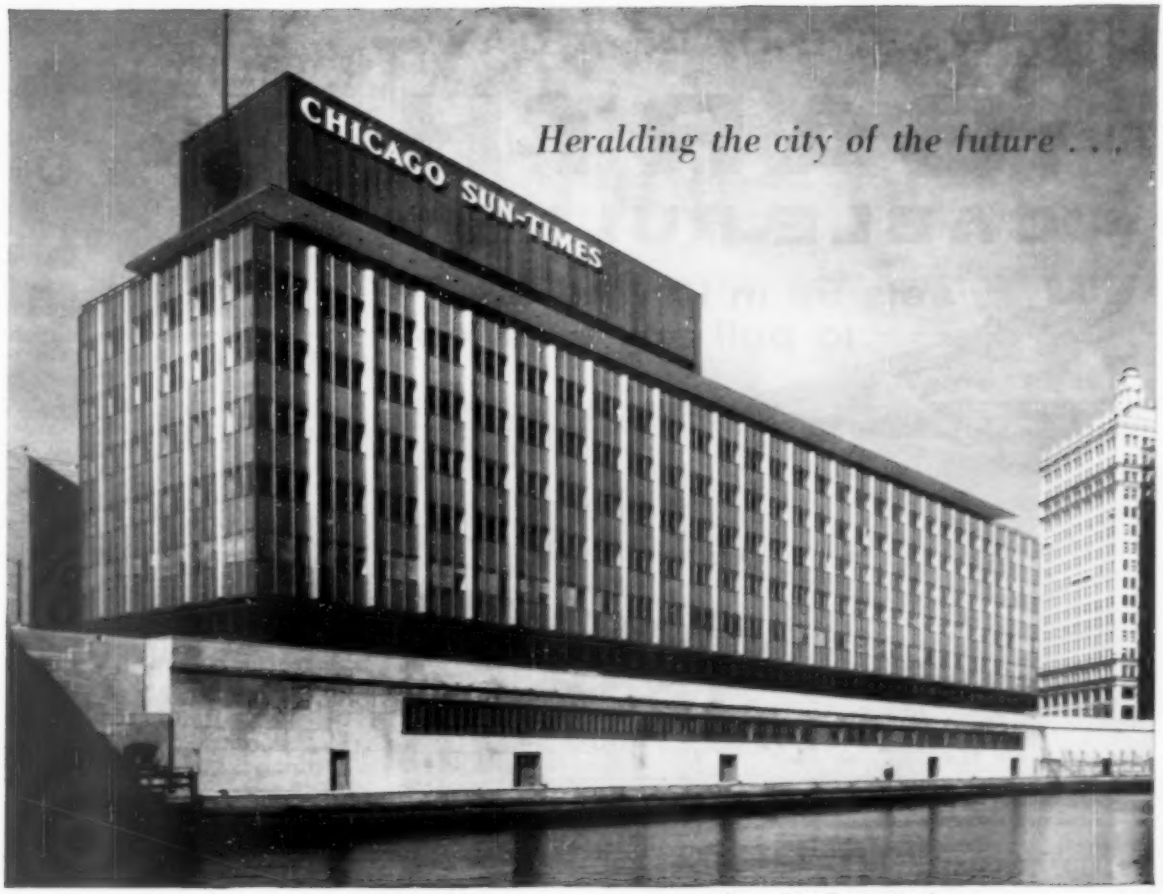
By Seidman, London, Karsh, and Tagliacozzo. Univ. of Chicago Press, Chicago 37. 300 pages. $5.75.

Handbook of Personnel Management and Labor Relations—This is a summarization of current thinking in all of the major areas implied by the title. As such, this handbook will be a valuable addition to the library of anyone active in the field. It should also appeal to managers in line functions other than industrial relations.

Throughout the book, subjects are discussed with a strong "how to" flavor; the authors obviously expect the reader to do something about the subject after reading the section on it. The one possible drawback here is that such a broad sweep of areas is involved that even 1216 pages is not sufficient for complete coverage. To offset this, however, there are numerous references to original source material for the reader who wants to carry the search further—*George A. Hoy.*

By Yoder, Heneman, Turnbull, and Stone. McGraw-Hill Book Co., 330 West 42nd St., New York 36. 1216 pages. $12.50.

For more facts circle 590 on Reader Service Card



Owner: FIELD ENTERPRISES, INC.
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NEW CHICAGO SUN-TIMES BUILDING

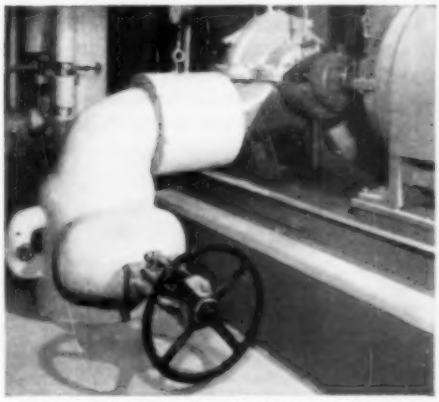
equipped with long-lasting, dependable JENKINS VALVES

IN ADVANCED PLANNING, as in location and design, the new Sun-Times Building is front-page news. For this is the first project to be completed in a development which will transform the area north of Chicago's Loop into a city of the future.

There can be only one basis for selecting physical equipment for such a plant: the ability to perform efficiently and economically *for years.* This is why Jenkins Valves are standard on all plumbing, heating and air conditioning lines in the block-long structure.

The extra measure of performance and reliability built into Jenkins Valves has for generations assured long operating life and low maintenance cost. That's well to remember when you specify valves . . . especially since the valves that bear the famous Jenkins Diamond mark *cost no more.* Jenkins Bros., 100 Park Avenue, New York 17.

Sold Through Leading Distributors Everywhere



10" Fig. 651-A Jenkins Iron Body Gate Valve, fitted with by-pass, on suction line of pump which supplies Chicago River Water as condenser water and process water for type foundry requirements.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
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Jenkins Bros

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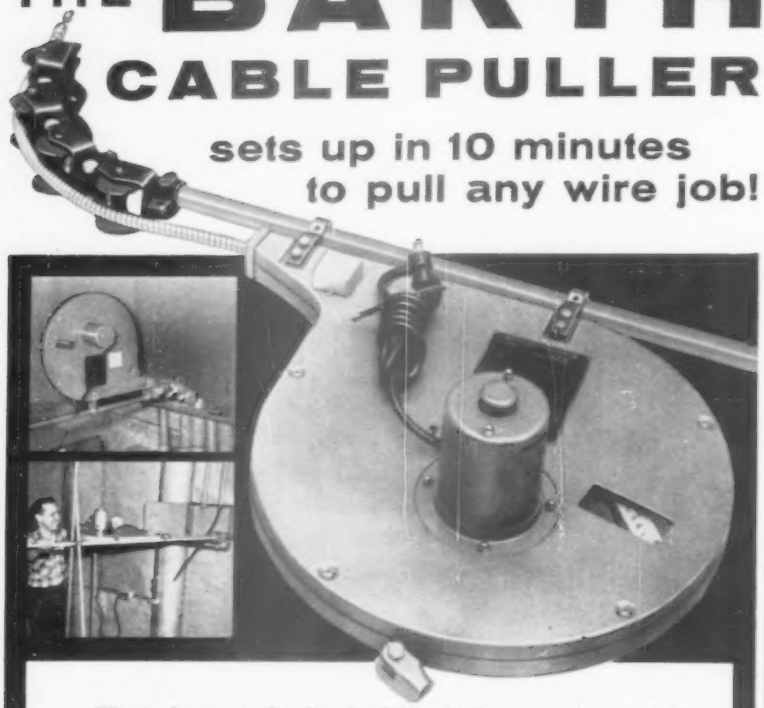
WHY WASTE HALF A DAY?

THE BARTH CABLE PULLER

sets up in 10 minutes to pull any wire job!



That's because the Barth Cable Puller was designed by experienced men on the job.

The easy-to-use accessories with every Barth Cable Puller enables the man on the job to make most set ups in a matter of minutes instead of wasting costly man-hours on old fashion winch or tackle rigs.

Compactness, light weight, and rugged power to spare makes wire pulling, even in cramped spaces, easy with the Barth Cable Puller.

Modernize and Save . . . you can bid lower and take more jobs with a Barth Cable Puller.

PUSHES TAPE and pulls wire . . . electrically!

THE BARTH CORPORATION 12655 BROOKPARK ROAD — CLEVELAND 30, OHIO

Please send the complete Cable Puller Data Folder

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CITY_____ ZONE_____ STATE_____

FACTORY FILMS

Half-Second Butyrate explains the laboratory and field tests made to determine the effectiveness of this protective coating for exterior aluminum surfaces. Shows how a large plant built in 1953 was restored and protected against further deterioration with this weather-resistant lacquer. 16mm, color, sound, 15 min. For loan, write:

Eastman Chemical Products, Inc., Kingsport, Tenn.

Principles of Frequency Response presents, in non-mathematical terms, the elements of this important tool for quantitative dynamic analysis of instruments and process systems. Answers such questions as: What is frequency response? How is it used in instrumentation? What is the controllability of a process? 16mm, sound, color, 37 min. For loan or purchase, write:

Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.

Forging in Closed Dies demonstrates, with all its exciting colors and sounds, the process of forging. One of the oldest of the metalworking arts, the craftsmanship in precision design and tooling is impressive. 16mm, sound, color, 27½ min. For loan, write:

Modern Talking Picture Service, 3 East 54th St., New York 22.

Automation and Mr. Halstead dramatizes the value of a thorough knowledge of developments in electrical technology. 16mm, sound, color, 30 min. Included is a 44-page manual "Automating Electrically." Film is the second on automation produced in company's "More Power to America" series. For loan, write:

General Electric Co., News Bureau, Schenectady 5.

* * *

Projectors for 16mm sound films can now be leased by the month under a new plan recently announced. Three portable models are offered. Renters of these projectors can change from leasing to purchase. For information, write:

Technical Service, Inc., 30865 Five Mile Road, Livonia, Mich.

For more facts circle 592 on Reader Service Card

For more facts circle 593 on Reader Service Card ➤

DOW CORNING CORPORATION

Silicone News

PRODUCTION & MAINTENANCE EDITION NO. 23

STICKY PROBLEM SOLVED

How do you store, ship or handle a product that sticks to everything? The very characteristic that makes certain products useful can also make them hard to handle. The labels this girl is applying, for example, grip packages for keeps. That's their best selling point. Called "Tamper Proof," they cling with such tenacity that there's almost no chance of being pulled off, inadvertently or otherwise.

But that desirable feature—for a while—was also a big problem to their maker, Presto Adhesive Paper Co. of Miamisburg, Ohio. Presto tried facing materials such as cloth, polyethylene, and many treated papers, but to no avail . . . "Tamper Proof" seized them like a magnet.

Then Presto tried parchment with a Dow Corning Paper Coating. No stick! The search had ended. This was the first and only facing material to strip easily from "Tamper Proof."

The silicone coating has no effect on the adhesive . . . it retains all its strength. Presto's problem has disappeared. And the silicone treated parchment from Kalamazoo Vegetable Parchment Co., costs less than many ineffective materials!

If you have a sticky problem with adhesives, asphalt, rubber, foods, or any other product, you'll want to investigate paper, paperboard, parchment and glassine with Dow Corning Paper Coating. There's nothing else like them. *No. 237*

NEW PAINT LASTS LONGER

On hot surfaces, conventional paints fail rapidly, and, if you don't keep repainting, rust sets in. Now, there's a new kind of paint available that resists heat, lasts longer, cuts maintenance costs. Here's how it reduced one company's costly repainting schedules.

The Cit-Con Oil Refinery, near Lake Charles, Louisiana, a joint enterprise of Cities Service and Continental Oil, is painted in silver and black, with the black on such hot surfaces as petrochem furnaces and boiler stacks.

However, conventional black paint lasted less than a year. So when annual shutdown time came for the steam boiler in 1952, maintenance engineers had its stacks painted with a single, brushed-on coat of a black finish by Allied Paint of Tulsa, based on Dow Corning Silicones. Later that year, all the other stacks in the plant were coated with the same finish.

Result: where formerly repainting was required every few months, the silicone finish lasts and lasts. Despite temperatures ranging from 350 to over 700 F, the silicone paint stays like new through as many as three annual shutdowns. *No. 238*

KEEPS MOLDS CLEANER

If your business is in molding — plastics, metals, rubber, or most any other material — you probably require mold release agents. And you can save money by using the best available.

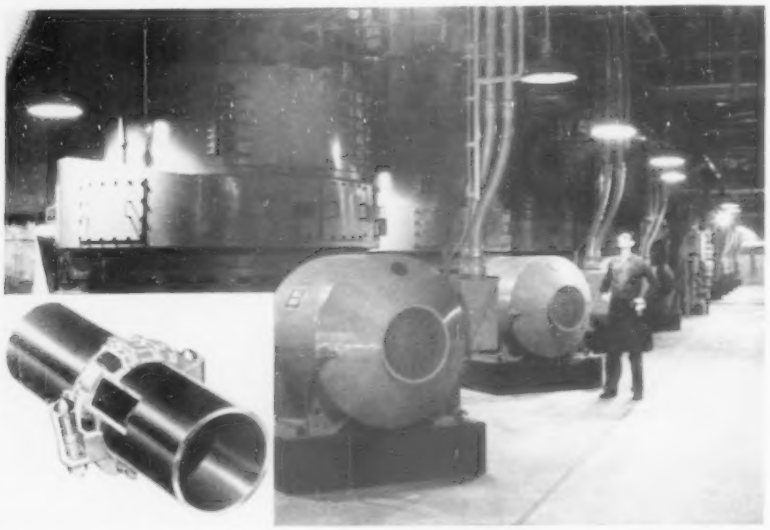
Allis-Chalmers (Pittsburgh Works) encapsulates small transformers (Cont. Pg. 2)

FOR DATA RELATING TO THESE ARTICLES, CIRCLE REFERENCE NUMBER IN COUPON ON NEXT PAGE

MORE

DOW CORNING CORPORATION

Silicone News



NOW: LONG-LIFE RUBBER PARTS

Seals, gaskets, O-rings and other industrial parts are now available in a HEAT RESISTANT rubber, Silastic*. This maintenance-saver is worth investigating. Here's how it cut replacement costs at Consolidated Edison:

Con Ed of New York utilizes some 234 flexibile couplings in its Astoria plant. These allow expansion and contraction in pipes feeding coal to the big boilers. Temperature of the pre-heated, pulverized coal in the lines was high enough, however, to cause ordinary rubber couplings to fail. Their average life was six months . . . occasionally as little as a week. Replacement labor costs ran $50 to $100 per coupling.

Con Ed cut those costs by trying some couplings with Silastic seals. (Couplings by Victaulic; seals by Niagara Rubber). Within the first few months of service, heat-resistant Silastic proved itself far more durable. At last report, none of the new couplings had shown any signs of failure. Tests indicate they will last indefinitely, and Con Ed is planning to use them throughout. *No. 240*

KEEPS MOLDS CLEANER *(Cont.)*

in epoxy resin. To get rapid, easy release of the epoxy casting from the mold, this firm first bakes two coats of Dow Corning R-671 Resin on the molds, then wipes them down again after each molding cycle with a very light coating of Dow Corning 7 Compound. Results include clean easy release, minimum scrap, and substantial reduction in mold maintenance costs. Molds are often in service for as long as *six to eight months* without needing cleaning. A considerable saving over the usual frequent cleaning schedules!

These are but two Dow Corning silicone release agents. There are many others, including 100% silicone fluids, solvent dispersions, and highly stable water-dilutable emulsions. They will do many varied jobs better, and the chances are that one of them will be a big help to you. *No. 239*

NEW LITERATURE AND TECHNICAL DATA ON SILICONES

How to Bond Silastic is described in a new data sheet that includes recommendations on choosing the adhesive, cleaning the surfaces and applying and curing bonding media. *No. 241*

Silastic RTV vulcanizes at room temperature and is a practical do-it-yourself product for applications where a heat-stable rubbery material is required. *No. 242*

Antifoam B, the lowest priced silicone foamkiller, has greater stability than any other water dilutable silicone defoamer commercially available. Antifoam B will not separate, oil out, settle or precipitate in most applications; retains uniformity and effectiveness even under adverse storage or operating conditions. Ready to use, it requires no diluting or pre-mixing. *No. 243*

Reduce relubrication costs with silicone lubricants made by Dow Corning. Heat resistant silicone greases and oils extend relubrication schedules and cut maintenance in a variety of industrial applications. All available types are described in an 8 page brochure that also describes factors that will help you obtain longer bearing life. *No. 244*

Silicone Insulated Motors Last Longer—Cost Less. A new brochure bears out this fact with numerous case histories of motors operated for years under adverse conditions in many different industries. An illustrated booklet, it's sure to suggest ways in which you can use silicone insulation to obtain low-cost protection against the effects of over-loads, high ambient temperatures, rapid reversing and moisture. *No. 245*

Dow Corning Silicone Compounds are inert, nonmelting, nongumming materials that have proved to be excellent for dielectric applications, for release of plastic and rubber moldings and for protecting finely machined thread parts. They are described and compared in a handy reference pamphlet. *No. 246*

Dow Corning Corporation, Dept. 516, Midland, Michigan
Please send me: 237 238 239 240 241 242 243 244 245 246

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SILICONE NEWS is published for production and maintenance men by

first in silicones

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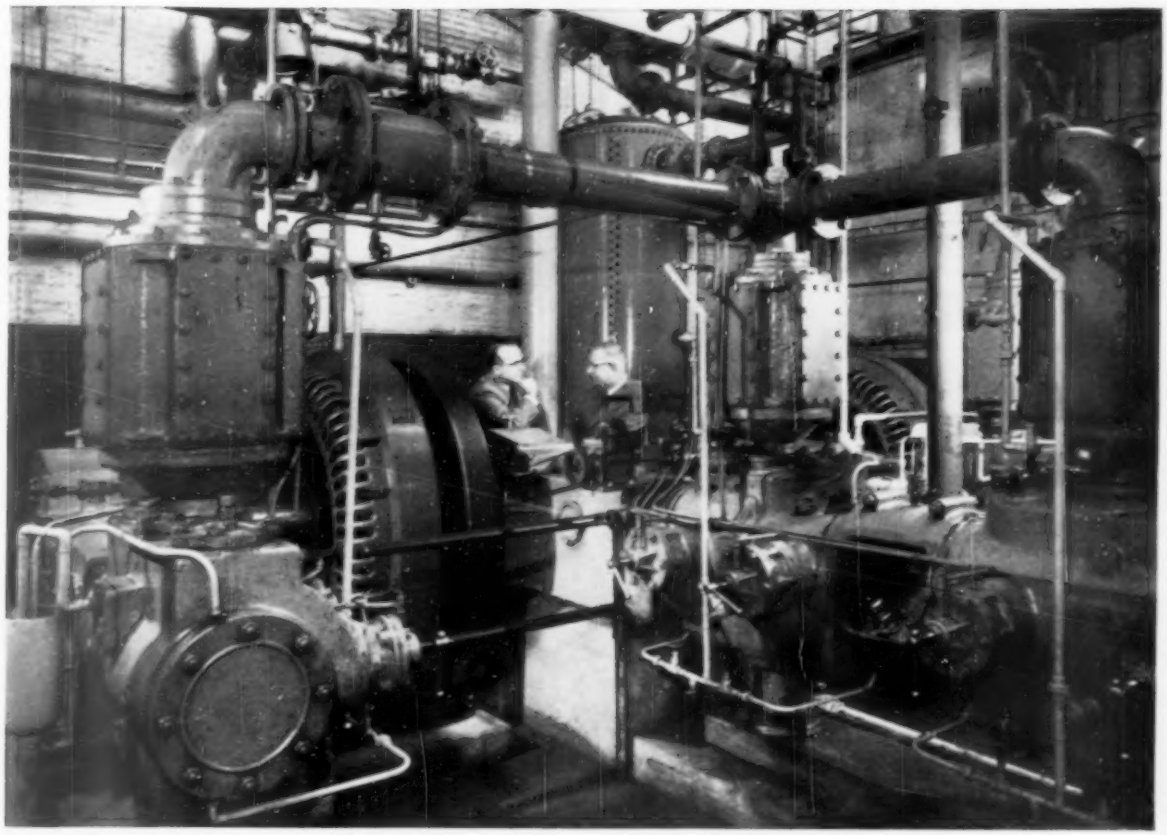

Compressor units like these are protected against premature wear and excessive maintenance cost when lubricated with Gulf Harmony Oil.

NEW and IMPROVED GULF HARMONY general purpose oil and hydraulic fluid

Gulf Harmony Oil, a long-time favorite multi-purpose oil, is now being specially processed to serve you better. Here are a few of Harmony Oil's many advantages:

- Higher oxidation resistance assures longer life and freedom from harmful sludge deposits.
- Retains its original viscosity over longer periods.
- Maintains its color stability longer.
- Anti-corrosion additive protects against rust.
- Patented anti-foam agent prevents objectionable foaming.
- Performs exceptionally well in bearings exposed to high ambient temperatures and humid atmospheres.

Gulf Harmony is available in the proper grades for every need. It is ideal for hydraulic systems, air compressors, blowers, dryer-roll bearings, machine tools, electric motors, central circulation systems, and a host of other applications.

Your Gulf Sales Engineer will gladly show you how new Gulf Harmony Oil can help cut your maintenance costs and simplify your lubricant storage and handling. Just call your nearest Gulf office, or write for illustrated bulletin.

GULF

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is identified 3 ways... for your permanent protection

1 BY MAKE... The Campbell "C" is permanently in relief on every other link... your Campbell identification.

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3 BY 5' INTERVALS... Campbell "Measure-Mark"... color-coded every five feet for quick, exact measurement... saves time.

From now on when you specify any of the four grades of Campbell Chain listed below, you'll always know the make, grade and length of every piece of chain in your plant. The *grade* and *make*—your two most important safety gauges—are permanently recorded where you need them most... right on the chain itself! Contact your distributor or write direct for details.

CODE SPECIFICATIONS

GRADE	PERMANENT GRADE MARK	COLOR-CODE "MEASURE-MARK"
Proof Coil Chain	P	Green
BBB Chain	B	Red
High Test Steel	H	Blue
Cam-Alloy Chain	A	Orange

CAMPBELL CHAIN

CAMPBELL CHAIN *Company*

York, Pa.—W. Burlington, Iowa

E. Cambridge, Mass., Chicago, Ill., Portland, Ore., Seattle, Wash.

Los Angeles, Sacramento, San Francisco, Calif.

Makers of Jiffy Lug-Reinforced Tire Chains and Blue Temper pre-cut, packaged chain

FACTORY / CATALOG NEWS

Begins on page 124

For more about these items, circle item numbers on Reader Service Card next to back cover.

are shown—resilient, shock-absorbing, semi-rigid, and rigid. Useful as pipe and sandwich insulation, etc. *E. I. duPont de Nemours & Co.*

BUILDING AND EQUIPMENT

31—Steel Shop Equipment. Work benches, portable and semi-portable units, tool stands, shop desks, table and accessory components are illustrated and described in an 8-page catalog (Form SEC). Shows equipment for many kinds of operations. Layouts. *Borroughs Mfg. Co.*

32—Heavy-Duty Flooring. Six money-saving answers to tough flooring problems are given here (No. 658, 4 pages). Explains use of emery aggregates, bricks, bonds, and cures. Photos illustrate each product. *Walter Maguire Co., Inc.*

33—Slot Machine Framing, Walls. Two illustrated catalogs discuss framing, fittings, movable walls. Catalog 100-4 has 32 pages of details on continuous slot framing. No. 580 (6 pages) tells about movable walls. *Power-Strut, Inc.*

34—Steel Shelving. This colorful 64-page catalog (No. 30) has helpful information on correct shelving for storing materials, loose and packed parts, books and records file, etc. Also describes storage cabinets and shop equipment. Photos. *De-Luxe Metal Furniture Co.*

35—Roof Ventilators. Catalog No. 2700 is an 8-pager with details about Type L-CRF Airfoil centrifugal power roof ventilators. Has capacity ratings, noise-level classifications, installation notes, accessories, photos, and drawings. *Ilg Electric Ventilating Co.*

36—Steel, Aluminum Windows. Two 16-page catalogs (AIA File No. 16H) describe galvanized tubular steel prime and aluminum prime windows. Both kinds of windows

B.F.Goodrich

Pneumatic tires?

Solid tires?

Free B.F.Goodrich TW Analysis tells you which tires are right for your job!

Can save you up to 50% on industrial tire costs!

Do you need a pneumatic or solid industrial tire? What tread design—what tread compound—is best for your materials handling work? The FREE B.F.Goodrich Tire and Wheel Analysis gives you the answers. They're answers that can save you up to 50% on industrial tire costs, up to 20% on maintenance.

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7 big reasons why A. O. Smith *Permaglas*® glass-protected (inside and out) smokestacks are your best investment

1. 3 to 5 times longer life than unlined steel stacks
2. corrosion resistance regardless of excess condensate
3. low maintenance — glass can't rust
4. lightweight — lower foundation cost
5. lower cost — glass protection now within reach of all
6. tough, durable — remarkable resistance to impact or abrasion
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Write Dept. F-6 for the Remarkable Facts!

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A.O.Smith CORPORATION

PERMAGLAS SMOKESTACK SALES
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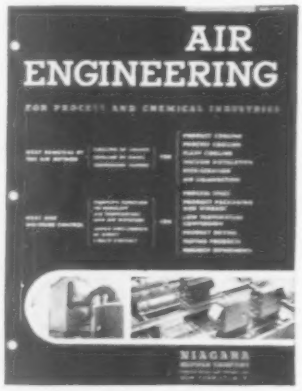
For more facts circle 597 on Reader Service Card

AIR ENGINEERING by NIAGARA

- AIR CONDITIONING with precise regulation of air temperature and air moisture for processing, for product drying, packing, storing, low temperature conversion, for testing and research.
- "NO FROST" REFRIGERATION for food and low temperature conversion, for testing and operations at extreme low temperatures; for moisture control below the freezing point of water.
- AFTER COOLING and air drying for large air and gas compressors and AIR LIQUEFACTION.
- COOLING ENGINES, COMPRESSORS, HYDRAULIC PRESSES.
- COOLING QUENCH BATHS, FURNACES, INERT ATMOSPHERES.
- COOLING ROLLS, WELDERS, DRAWING OR EXTRUSION DIES.
- PRODUCT AND PROCESS COOLING CHEMICALS OR INTERMEDIATES.
- COOLING LIQUIDS OR GASES IN CLOSED SYSTEMS.
- VAPOR CONDENSING UNDER VACUUM.
- REFRIGERANT CONDENSING.
- ELECTRONIC PROCESS COOLING.

You will reduce your costs, solve your problems of water supply or disposal and get HIGH OPERATIONAL EFFICIENCY with Niagara "Aero" Evaporative Heat Exchangers, After Coolers, Condensers, Air Conditioners or Coolers for these important plant services or processes.

High operational efficiency means: precise temperature for improved product and process quality control, heat removal at rate of input, simple operating conditions, real economy in upkeep, sustained full capacity. It means the lowest expense for up-keep.



Write for this Bulletin No. 135

Write for Bulletin 135

NIAGARA BLOWER COMPANY
Dept. F-6, 405 Lexington Ave., New York 17, N. Y.
Niagara District Engineers in Principal Cities of U. S. and Canada

Begins on page 124

For more about these items, circle item numbers on Reader Service Card next to back cover.

come in complete assemblies in package units. Specs, installation data, and diagrams are included. *The F. C. Russell Co.*

37—Steel Storage Lockers. Twelve locker styles, with features of design and construction improvements are presented in this 8-page bulletin (B-60). Lockers come in three standard and six special colors. Includes photos and dimension tables. *Alan Wood Steel Co.*

INSTRUMENTS AND CONTROLS

38—Hygrometer. Bulletin EH-4001 (4 pages) provides data about portable, panel-mounted, and explosion-proof models of an electrolytic hygrometer. Gives information on features, operation, dimensions. Illustrated with photos and flow diagrams. *Beckman Instruments Inc.*

39—Airsonic Stethoscope. This 8-pager describes use of stethoscope with special accessories for detecting many types of trouble in machinery and equipment. Instrument detects vibration, bearing wear, boiler hot spots, piping, pressure and vacuum leaks. *M. Paquet & Co.*

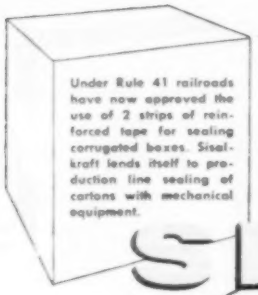
40—Gas Regulators. An illustrated 20-page catalog (F-4490H) gives specifications for 47 regulators for use with industrial gases. Also covered are single- and two-stage regulators for station and manifold service. Includes regulator service data table. *Linde Co.*

41—Air Gaging Cartridges. Here's a 32-page catalog (PGC-58-1) that gives details about maker's Plunjet pneumatic size-sensing pick-up units for use with air gages. This "engineering manual" tells where and how to use the cartridges. Photos. *The Sheffield Corp.*

42—Thermometers. How to select an indicating, recording, or controlling instrument is explained in this

For more facts circle 598 on Reader Service Card

2 Strip Sealing Cuts Labor Costs 66⅔%



Yes, *down go costs* when you seal with 2-way reinforced Sisalkraft Sealing Tape. Way down . . . it's automatic *and* fast. You save ⅔rds the work. Sisalkraft Sealing Tape also lends itself to production line sealing. Write us for more facts about reinforced tape and how it can save money in your shipping room. American Sisalkraft Corporation, Attleboro, Mass. Manufacturers of sealing tape stock for the Gummed Paper Industry.

SISALKRAFT

Reinforced **SEALING TAPE**

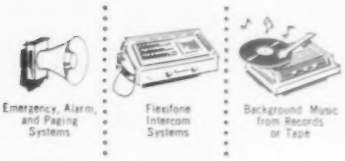
For more facts circle 599 on Reader Service Card

own your own

PRIVATE
telephone system

Fully Automatic Interoffice Communication with your own DuKane dial telephone system can cut switchboard loads by 50% or more. Every call is quick, personal, and private. Economical systems can be installed for any number of stations, and easily enlarged or expanded to include intercom, paging, alarm, or central sound systems.

DuKane manufactures a complete line of communications products for industry, with a nationwide network of more than 300 engineering distributors ready to help solve your individual problem. Your nearest DuKane man is listed in the Yellow Pages.



DuKane
CORPORATION

pioneer in industrial communications

DuKane Corporation, Dept. F-68s, St. Charles, Ill.
☐ Send me information on owning my own closed-circuit telephone system
☐ Have a DuKane communications consultant call at my office

Name_____
Company_____
Address_____
City & State_____

FACTORY / CATALOG NEWS

Begins on page 124

For more about these items, circle item numbers on Reader Service Card next to back cover.

56-page catalog (C60-2). Describes company's line of indicators, transmitters, and electric or pneumatic control instruments. *Minneapolis-Honeywell Regulator Co.*

43—Automatic Controls. Catalog No. 858, 60 pages, presents data on automatic controls for pressure, temperature, liquid level and mechanical movement. Includes info on relays, magnetic and tilting type mercury switches; other details, photos. *The Mercoid Corp.*

44—Air Gage Instruments. Catalog No. 357 is a 20-page illustrated reference guide to air gage members for all types of circuits. Covers the back pressure, flow, and differential types. Includes schematic diagrams. *Freeland Gauge Co.*

MAINTENANCE

45—Welding Equipment. Here's a 12-page catalog that illustrates and describes maker's complete line of arc welding cable connections and accessories. Includes information on all the components that are needed "from the electrode to the machine." *Tweco Products, Inc.*

46—Ladders and Accessories. Catalog L-71-RR has 24 pages of photos and description of wood and aluminum step, single, extension ladders, and accessories. These include trestles, jacks, hooks, irons, etc. Has specs, sizes, and styles. *The Patent Scaffolding Co., Inc.*

47—Tools. Three catalogs list and illustrate gasoline and electric tools, air tool kits. CI-1657 (44 pages) covers company's gasoline and electric tools; AT-1457 (28 pages) deals with air tools; CI-2857 (4 pages) discusses two tool kits. *Mall Tool Co.*

48—Portable Work Tower. This 4-page bulletin (No. 18, Section A) shows a portable one-man work tower built in two models. Both raise the platform by means of a hy-

Years of experience solving special material handling problems produced this revolutionary Colson Lifter. Used to move motors to storage, it re-places fork trucks at the General Motors South Gate plant.

Load is raised or lowered at the same time the Colson Lifter travels to and from storage area on tracks. Operator always has full control with load in view and one hand free for extra tasks.

Powered by Colson exclusive Hydraulic drive, V-Grooved wheels carry the Colson Lifter on rails at 320 fpm . . . hoist speed is 30 fpm. Operator quickly and accurately reaches exact storage or removal area.

Custom-assembled from basic Colson engineered components, lifting devices of all designs can be made to meet individual needs at costs no higher than for conventional equipment.

Use Colson to speed up your material handling, cut your manhours, reduce your space requirements and meet today's need for automation. Your local Colson distributor can help you. Call him or write to:

COLSON CORPORATION
Special Products Div.
Somerville, Mass.

The Colson Corporation
A Subsidiary of Great American Industries, Inc., Elyria, O.
Plants in: Jonesboro, Ark., Elyria, Ohio, Somerville, Mass., and Toronto, Canada

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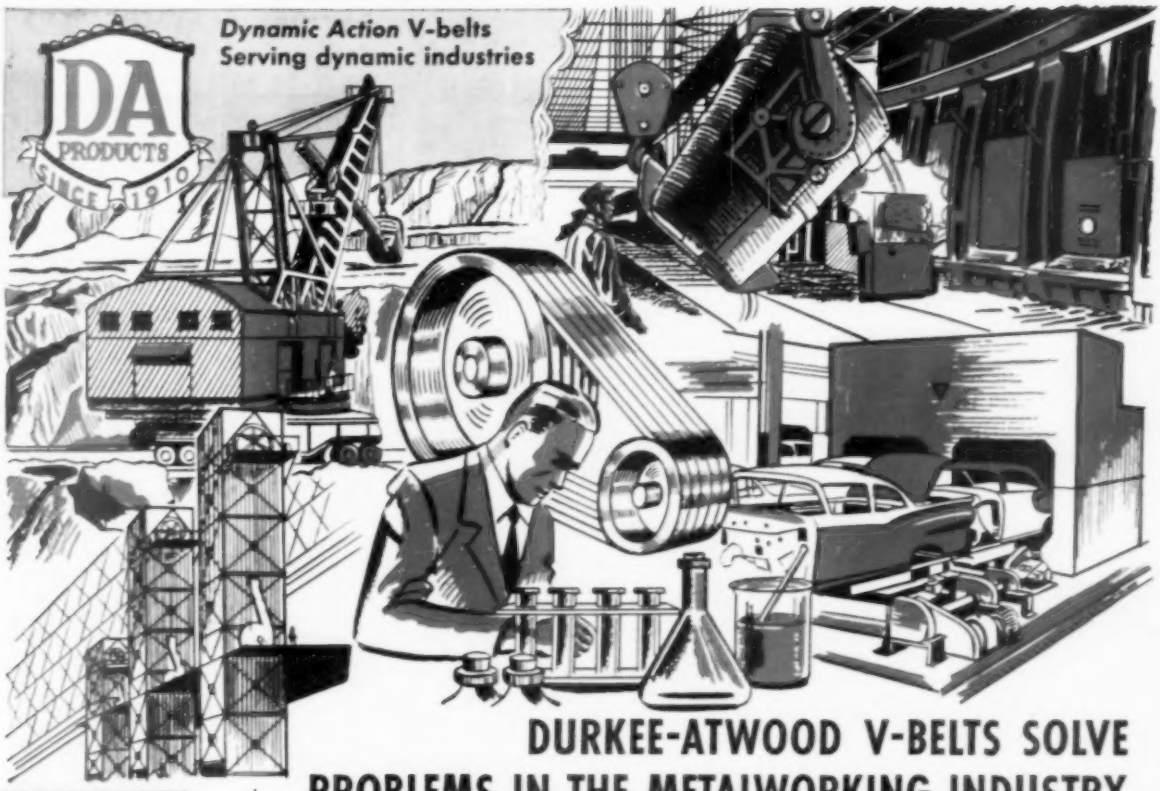
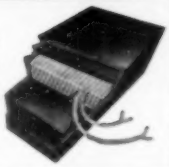


DURKEE-ATWOOD V-BELTS SOLVE PROBLEMS IN THE METALWORKING INDUSTRY

DURKEE ATWOOD V-BELTS *a complete line serving industry*

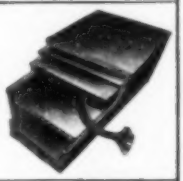
MULTIPLE V-BELTS

Standard Line for normal loads.
Premium Line with 40% extra capacity for high loads.



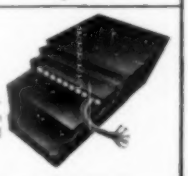
STEEL CABLE V-BELTS

A complete line of steel cable reinforced V-belts.



GENERAL DUTY V-BELTS

Power-balanced construction for maximum flexibility, durability and strength.



DOR-TITE

for weather proofing . . . sound proofing . . . draft stopping, etc.

SPONGE RUBBER

for cushions . . . gaskets . . . mounting pads, etc.

Metalworking's power transmitters . . . the V-belts in action throughout the industry . . . perform a vital job. Power means production. That's why the belts driving the blowers, broaches, compressors, conveyors, crushers, cutters, dryers, drillers, grinders, lathes, millers, polishers, screwers, shapers, slotters, etc., must carry the load and carry it long no matter how tough the conditions.

Durkee-Atwood V-belts serve the metalworking industry by solving problems.

When load requirements call for additional regular belts and increased sheave costs . . .

When oil, grease and other chemicals rob standard belts of life . . .

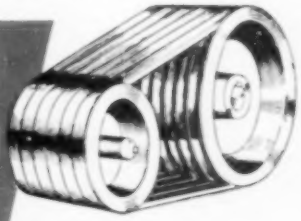
When heavy shock loads increase replacement costs of regular belts . . .

When smooth, vibrationless drive is missing from regular belts . . .

When extreme temperatures limit total power transmission with regular belts . . .

. . . then you'll appreciate how the complete line of Durkee-Atwood Standard, Hyload (Premium) and Steel Cable V-belts can help your production schedules. Durkee-Atwood engineers apply field tested formulas with special synthetic rubber compounds and special fibres or steel cables to provide the right belts to solve these and other power transmission problems. Let Durkee-Atwood help *you*.

DURKEE ATWOOD COMPANY



FEderal 2-0441 **Minneapolis 13, Minn.**

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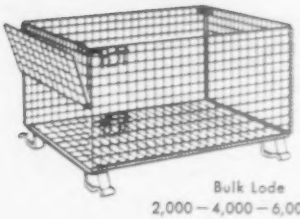
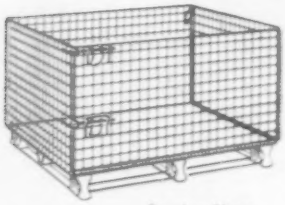
for SAVINGS

USP

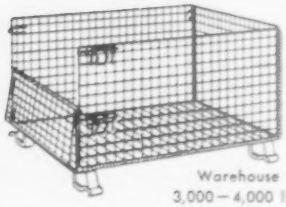
PALLETAINERS®



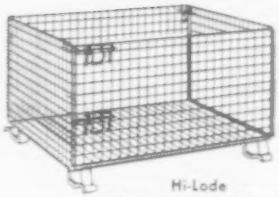
Bulk Lode
2,000 – 4,000 – 6,000 lbs.
Capacities



Bearing Plate
2,000 – 4,000 – 6,000 lbs.
Capacities



Warehouse
3,000 – 4,000 lbs.
Capacities



Hi-Lode
2,000 – 4,000 – 6,000 lbs.
Capacities

The big, new Palletainer catalog will be sent to you immediately without obligation. However, should your problem require immediate assistance our nearest representative will contact you at your request.

Interested in getting more out of your materials handling dollars? Then send for your copy of Union Steel's big, well illustrated Palletainer catalog.

It will quickly and clearly indicate how you can make important savings in materials, time, space—and above all . . . man hours!

There are dozens of interestingly different applications that will show you new handling, storing, warehousing and shipping methods. Also, detailed information on Palletainers exclusive construction features plus complete specifications on the many versatile models available.

UNION STEEL PRODUCTS COMPANY
515 N. BERRIEN ST.
ALBION, MICHIGAN

Gentlemen: Please send me my copy of your new Palletainer catalog at once.

Name _____ *Title* _____

Company _____

Address _____

City _____ *Zone* ____ *State* _____

Please have your nearest Palletainer representative contact me ☐

FACTORY / CATALOG NEWS

Begins on page 124

For more about these items, circle item numbers on Reader Service Card next to back cover.

draulic pump but they differ in power supply. Has specifications and photos. *Safway Steel Products, Inc.*

49—Saws, Drill Presses. Useful features of heavy-duty saws are listed in this 8-page illustrated catalog (Form No. 513), with specs and blade selection chart. Single sheet (Form 63) shows magnetic drill press with hydra-power feed. *The Black & Decker Mfg. Co.*

50—FencPainteRs. New methods are described in this 52-page 1958 catalog that covers painting products. Shows brushes, rollers, weed killer spreaders, floor striper, spray unit, exterior and interior finishes (with colors). Illustrates applications. *FencPainteR Div.*

51—Hand and Power Tools. Catalogs P-16R(N) and H-157 cover hand and electrical tools, while D-15-3 describes precision tools and complete unit of cabinet and tools. Photos, sizes, and other info in each booklet. *Millers Falls Co.*

52—Floor Cleaning Machine. Multipurpose floor maintenance machine that can be used for scrubbing or polishing is described in 4-page folder, with separate sheet of specs. Unit is equipped with twin 13-in. brushes to provide 24-in. swath. *Advance Floor Machine Co.*

PIPES & FITTINGS

53—Valves. Illustrated 4-page catalog (167) describes 150-lb. WSP bronze globe, angle, check valves. Bronze renewable disk valves feature hard composition, all-purpose disks for temperatures to 500 F. Service ratings. *Walworth Co.*

54—Hose Fittings. Re-usable Hozelok-40 full flow fittings for rubber-covered wire braided hose are discussed in 8-pager (No. 4440). Lists hose and hose assemblies, with instructions. Tables, photos, diagrams. *Parker-Hannifin Corp.*

Turn the page

materials-handling news

NEW AND UNUSUAL APPLICATIONS OF BASSICK CASTERS THAT MIGHT BE ADAPTED TO YOUR HANDLING PROBLEMS

BOEING SKIN DOLLY

Bassick Floating Hub casters (dual wheel) on the lattice-work dolly, above, carry and cradle wing skin panels at Boeing Airplane Company's Seattle plant. Floating Hub construction absorbs shock and snubs out vibration which could otherwise harm loads, dollies, casters and floors.

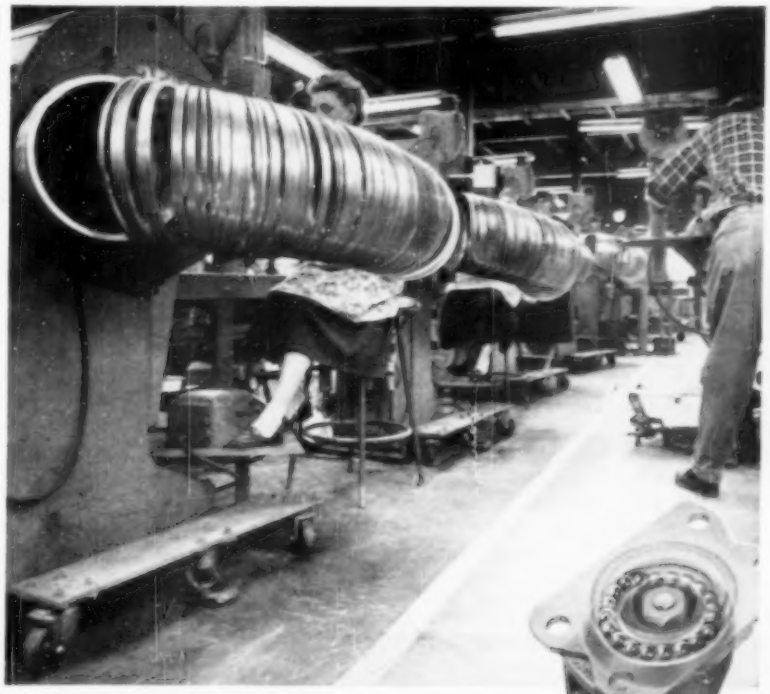
TIRE CORDS

Castered frames are ready to be moved into position for tire fabric production at Goodyear Tire and Rubber Company's Southern Mills. Caster failure here could cause a costly production halt.

CASTERS ON LIFT-A-LOFT

Lift-A-Loft Company's overhead maintenance equipment lifts a man up, wherever he needs to go. Completely self-powered, Lift-A-Loft rolls into position on Bassick Casters. They are a sure sign of quality on modern industrial equipment of all kinds.

see our catalog in Sweet's or write for copy



Two level ball race aids efficient swiveling

In these Bassick Series 77 Casters, above, a single raceway of balls operates on two levels to take both direct and component thrust loads. The hardened and polished steel balls, operating on a large two-level raceway, change level through tunnel passageways where they are not under load. Result of this Bassick exclusive is greater swiveling efficiency, more strength, easier action. **Casters on machine tools permit flexible assembly line set up.** These Series 77 casters help speed production now at the Torrington Manufacturing Company, Torrington, Connecticut. Mounted on fifty machine tools, Bassick casters enable Torrington to rearrange assembly lines as different products go into production. These casters, incidentally, are equipped with new Bassick "Atlasite" wheels that carry loads almost like iron, yet are a lot easier on floors. Bassick position locks hold the machines steady in operation. Is there a materials-handling angle here for your plant?

B-41

NEW HANDLING IDEAS FROM YOUR DISTRIBUTOR Latest caster improvements and new application ideas often come your way when you talk to your local distributor who carries Bassick casters. He gets around to a lot of plants, sees a lot of time-and-money-saving materials-handling methods. Call him on your handling problems.

Bassick SYMBOL OF EXCELLENCE

THE BASSICK COMPANY, Bridgeport 5, Conn. In Canada: Belleville, Ont.

For more facts circle 604 on Reader Service Card

For more about these items, circle numbers on Reader Service Card next to back cover.

55—Steel Valves. This 4-page brochure contains applications, installations, and specifications for maker's latest steel valve—the Keroseal. It's a full opening, double block and bleed, non-lubricated, optional flow valve with vapor-tight seal. *Kerotest Mfg. Co.*

56—Tube Assemblies. Catalog 500 covers tube forming and describes a specially designed tube assembly. Shows tube benders, and shearing, trimming, and testing devices. Also explains company's facilities for producing custom tubing assemblies. *Aeroquip Corp.*

MATERIALS HANDLING

57—Cranes. This spiral-bound 42-page catalog (CR-610) is a second edition that describes new designs and improvements in maker's cranes, hoist gears, and cases. Includes specifications, operating speeds, how to select, photos of applications. *Ederer Engineering Co.*

58—Woven Wire Slings. Advantages and typical uses of metal-mesh slings are discussed in an illustrated 24-page catalog. Presents info on handling of bar stock and pipe to boats and firebrick, with capacities according to hitch used, etc. *The Cambridge Wire Cloth Co.*

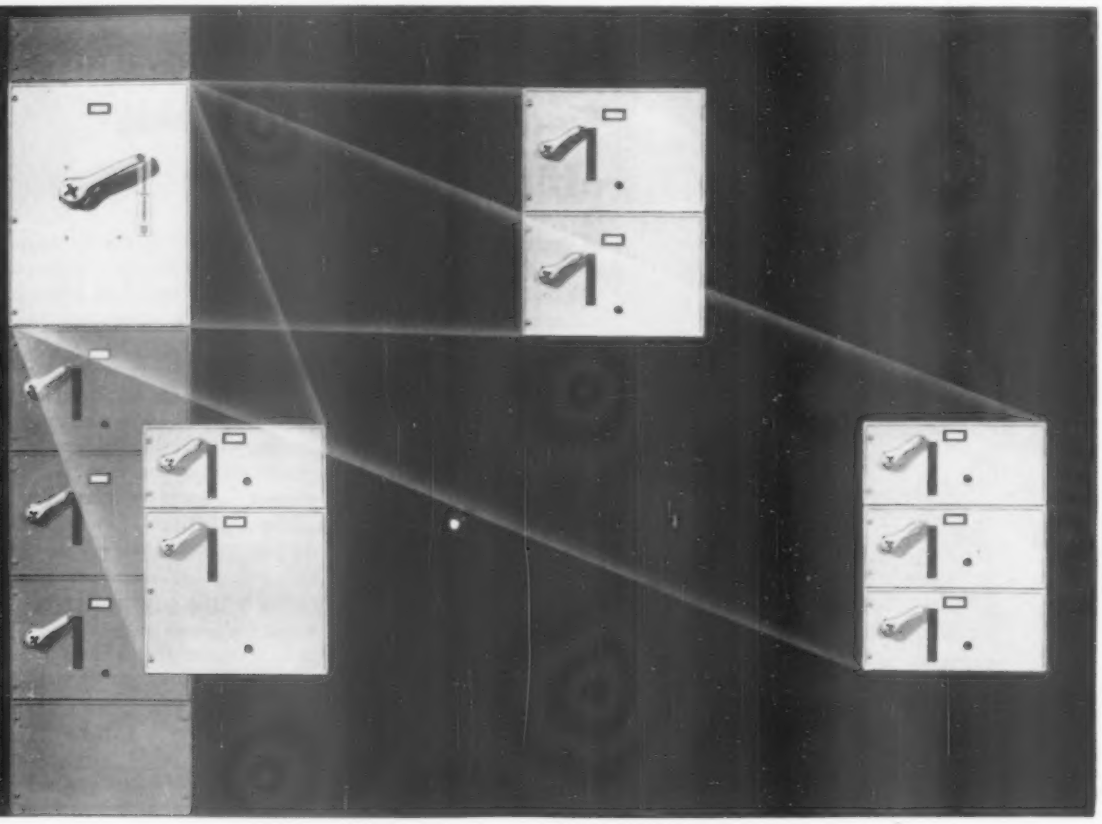
59—Ceramic Magnet Pulleys. Bulletin 1021 (4 pages) explains how "radial pole design" boosts magnetic power of Series 410 and 710 Indox V permanent magnet pulleys. Said to give greater tramp iron removal capacity at higher belt speeds. *Stearns Magnetic Products.*

60—Crane Control Equipment. This 20-page Bulletin 9100 covers the selection and application of d-c crane control for hoist, bridge, trolley service. Performance curves, diagram, other data, photos. *The Clark Controller Co.*

61—Hand Hoists. Bulletin DH-164-C has eight pages of info on hand hoists with 17 different lifting capacities—from ½ to 50 tons. Includes sealed construction description, load chain table, clearance data and dimensions, photos. *American Chain & Cable Co., Inc.*

62—Fork Truck Maintenance Chart. This heavy-paper, clearly printed chart is to help you systematize electric fork truck preventive maintenance. Offers tips for maximum truck efficiency, pinpoints 28 areas to be inspected regularly. *Lewis-Shepard Products, Inc.*

63—Conveyors. Two booklets, diagram of typical system, plant and conveyor planning grids, make up a handy folder on conveyors. One



booklet (16 pages), with photos, shows uses of overhead conveyors. Other has 4 pages of info on all-purpose conveyor. *Chainveyor Corp.*

64—Hydraulic Crane. Here's a 6-page fold-out bulletin (AD2407) that illustrates crane, attachments, and special equipment. Technical tables give principal dimensions, etc., and diagrams show high and low shippers. *Austin-Western Construction Equipment Div.*

MISCELLANEOUS

65—Marking Machines. This illustrated catalog (8 pages) describes 25 machines for marking items ranging from transistors to instrument scales and spaghetti tubing. Data includes specifications of imprint and object sizes, speeds, mounting, etc. *Markem Machine Co.*

66—Miniature Ball Bearings. Here's a revised 8-page 1958 catalog (Form 57) with info on MPB ball bearings. Sizes are from 3/8 in. down to 1/10 in. outside diameter. Load ratings, speeds, lubrication, torque conversion, other data. *Miniature Precision Bearings Inc.*

67—Filter Frame. This 4-pager describes a low cost filter bank assembly that features maker's new seal tight filter frame. Explains how polyvinyl chloride gasket makes possible the dust-tight seal between filter and holding frame. Gives specs. *The George Evans Corp.*

68—Foam Systems. Safety code for the inspection, maintenance, and protection of fixed foam systems is given in this 6-page brochure, punched for 3-ring binder. Outlines three foam systems now in use—chemical, indoor, outdoor. *Fire Equipment Mfrs. Assn., Inc.*

69—Tooling Plastics. Bulletin EP-58-7 has four pages that describe use of epoxy resins in automotive, machine shop, metal trades, other related fields. Discusses manufacture of plastic tools with Epocast. Illustrations. *Furane Plastics, Inc.*

70—Two-Way Radio. Designed for materials handling equipment, this radio communication tool is described in Catalog E190 (8 pages). Has info on long-life transistors, versatile mounting, power supply. *Motorola, Inc.*

71—Outdoor Lighting. This illustrated 4-pager (Catalog S158) shows outdoor lighting units that provide beauty, utility, economy. Describes post top mounting and pendant mounting, three lighting sources. *Silvray Lighting, Inc.*

72—Internal Telephone System. Circular No. 1889, 4 pages, presents Type 85 P-A-X, the newest in maker's line of automatic electric systems. Takes care of 10 telephones. *Automatic Electric Sales Corp.*

73—Demineralizers. An important phase of water treatment, dimineralization, is discussed in Bulletin WC-111A (30 pages, illustrated). Applications, principles of operation and chemistry of ion exchange resins. *Graver Water Conditioning Co.*

Westinghouse CONTROL CENTERS feature dual-modular units to solve your space problems

The efficient design of these new Westinghouse units is the answer to today's . . . and tomorrow's . . . need for complete flexibility in control center installations. Westinghouse control centers are ready to meet any demand for expansion or modification.

You get complete versatility with dual-modular units, plus unit space selection to meet your demands. Steel or aluminum Westinghouse control centers will house a complete range of devices to meet specialized control requirements.

For complete information on the control center for your plant, call your local Westinghouse representative. Or, write Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

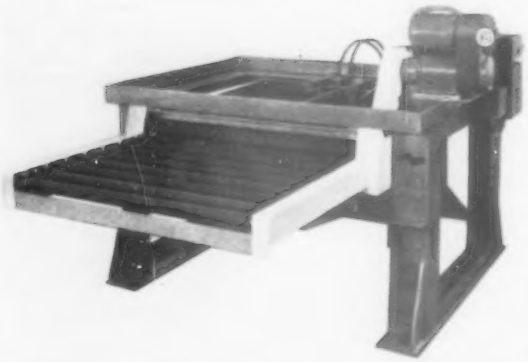
J-22107

POWER-UP starts with CONTROL

YOU CAN BE SURE...IF IT'S Westinghouse

For more facts circle 605 on Reader Service Card

For more about these items, circle numbers on Reader Service Card next to back cover.



MAGNETIC ROLLS STACK AND FEED WITH EASE

DENMAG RUBBER "PULLS" METAL PRODUCTS

Magnetic Rubber Works Magic in Many Areas

How often have you seen magnetic rubber? Here it is —a new tool for plant operation. It's said to have many of the properties of a magnet—and to act like one, too. It is expected to open up a whole area of new applications, economies, and ways to cut costs in handling ferrous materials and parts in the metal producing, processing, and fabricating industries.

This new material, called Denmag, is produced by compounding Neoprene or other rubber and plastic substances with various permanent magnetic materials of small particle size.

The magnetism can be applied in a variety of patterns to facilitate handling and tracking. For example, a roll can be treated so the magnet forms a straight or spiral pattern, with non-magnetic sections between. Thus, the pieces handled are tracked and guided properly to the next operation.

Another advantage is its easy fabrication into various shapes so that materials of different cross-sections can be handled easily. It can be compounded to produce either strong or weak magnetic fields; is well-suited for handling square, rectangular or odd-shaped pieces such as oval, circular, trapezoid, star, etc. The rubber provides a soft surface that prevents marring or scratching, so eliminates any possibility of damage to the parts during handling.

The Herr Equipment Corp. (Circle 251, Reader Service Card.)

New Insulation for High Temperatures

A new family of epoxy-resin-bonded micaceous insulation has been developed for use with Class B electrical equipment. This Isomica-Epoxy group combines Samica reconstituted mica with epoxy resin binders. Resulting material is said to have outstanding heat and chemical resistance, good dielectric properties, extreme uniformity in thin sections, and good mechanical strength. Its flexibility is achieved with a special catalyzing system—not by the addition of plasticizers.

This insulating material comes in both rigid and flexible forms. The rigid forms include segment plate, molding plate and tubes; the flexible forms include slot liners, sheets, tapes, and combinations. Both these forms are available with the resin binder fully or semi-cured, and both forms have excellent resistance to compression.

Mica Insulator Div., Minnesota Mining & Mfg. Co. (Circle 252, Reader Service Card.)

Turn the page

Alemite Portable Lubricator Saves 95 Man-Hours For Every Drum of Lubricant Applied!

Every point of lubrication in your plant can cost you needless time and money if you use old-fashioned hand lubrication methods!

With this Alemite portable air-powered lubricator, you save *95 man hours* for every 400-lb. drum of lubricant applied. Over *two* weeks of one man's time saved. That's how you can cut maintenance costs with Alemite.

In addition, Alemite's Model "711-A" is so compact and portable that it can bring clean, waste-free lubrication to *any* machine—*anywhere* in your plant—reducing machine downtime and prolonging machine life. Its pivot-swing dolly holds container upright at any pulling angle for easy moving over rough ground, indoors over rough floors, even up and down steps!

Step up to fast-moving, time-saving lubrication methods! Check Alemite's complete line of air-powered and electric-powered lubrication equipment for industry.

Symbol of SW Excellence

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

1850 Diversey Parkway, Chicago 14, Illinois

MAIL COUPON FOR COMPLETE INFORMATION!

Alemite, Dept. E-68
1850 Diversey Parkway, Chicago 14, Illinois
Please send me your free catalog of Alemite industrial lubrication equipment.

Name .....
Company .....
Address .....
City ..... Zone ..... State .....

For more facts circle 606 on Reader Service Card

faster

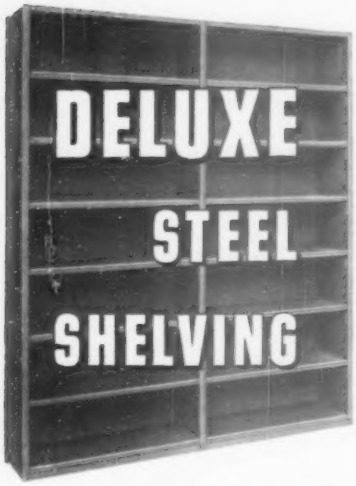
TO ERECT

faster

TO RE-ARRANGE

faster

TO PAY FOR ITSELF



faster because . . . the exclusive Deluxe patented *boltless* shelf bracket replaces 90% of time-consuming nuts and bolts, providing quick installation and quick, easy shelf adjustment.

Proof of this has been demonstrated again and again at trade shows where two men erected a complete section of Deluxe Shelving in less than 5 minutes.

For any shelving storage problem, use Deluxe—the finest-designed and sturdiest shelving made. Call your local Deluxe dealer for quick, efficient layout service. Or write for the new Deluxe Shelving Catalog #30.

DELUXE METAL FURNITURE CO.

Warren 8, Pa.

A division of the Royal Metal Mfg. Co.

DELUXE

FACTORY / MATERIALS NEWS

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For more about these items, circle item numbers on Reader Service Card next to back cover.

253—4-D Wrought Iron, one of the newest in the field, has increased corrosion resistance, greater uniformity, improved physical and mechanical properties. May be readily forged, cut, bent, threaded. Self-fluxing action helps produce durable welds. *A. M. Byers Co.*

254—Colored Stainless Steel, produced by the Permyron process, is now available in black. One of its advantages is lower light reflectivity. Coloring is so flexible that stainless sheet can be deep-drawn and bent without cracking or crazing. *Electro Metallurgical Co.*

255—Ceramix, a new spray-on vitreous finish for coating cinderblock walls, gives a high-glaze finish. Application is made by painting contractors who must receive training to qualify for an applicating license. Equipment is specially designed. *Preco Chemical Corp.*

256—Four Ferro-Alloys have high corrosion resistance. Hastelloy B, Hastelloy F, Hastelloy C, and titanium, rolled in clad plate form, are expected to be cost-savers wherever corrosion is a problem. Nickel and chromium, with other alloying elements, are used in their composition. *Lukens Steel Co.*

257—Pyroceram, a tough opaque, crystalline ceramic, can be formed by any high-speed glass manufacturing method. It is suitable for such end-products as tubing, flasks, ovenware, ball bearings, piston heads, etc. *Corning Glass Works.*

258—Evr-Tite is a fast-setting pourable cement in powder form for speedy bolt anchoring. It mixes readily with water and sets in 10 minutes. Other applications include the fastening and setting of pipe flanges, partitions, and parking meters. *The Monroe Co., Inc.*

259—Bondstrand is a corrosion-resistant plastic pipe, said to be as strong as steel, but only 1/8 the weight. Composed of interwoven

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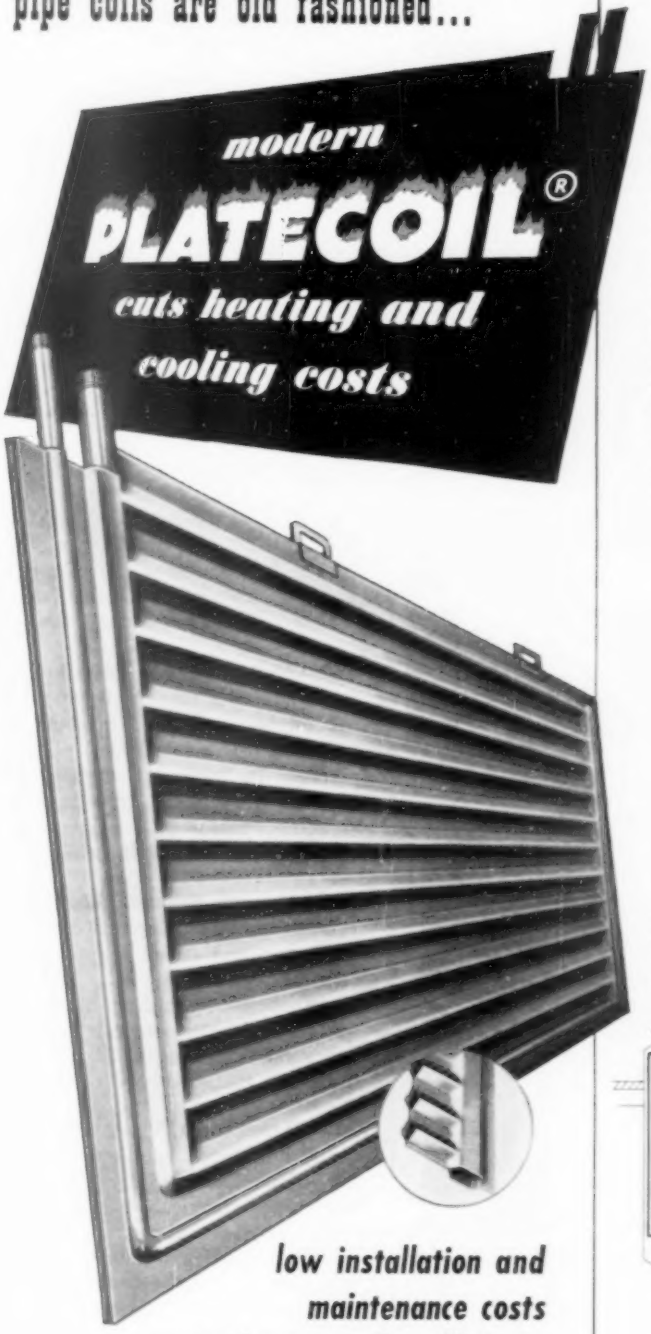
pipe coils are old fashioned...



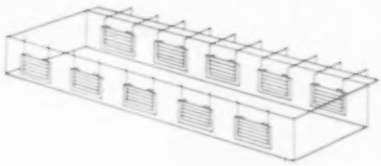
low installation and maintenance costs
greater heat transfer efficiency
lower space requirements

Write for free Bulletin P-60 "HOW TO CUT HEAT TRANSFER COSTS WITH PLATECOIL" for complete information.

KAWNEER uses stainless steel PLATECOIL® units in acid anodizing tanks

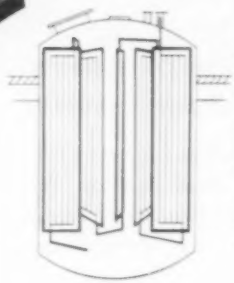
Ease of changing, cleaning and repair are among the advantages of PLATECOIL over pipe coils cited by the KAWNEER CO., Architectural Products Division at Niles, Michigan. Low installation costs, good maintenance and space savings over pipe coils plus heat transfer efficiency are advantages which this company has obtained by using PLATECOIL. The PLATECOIL units are used for heating in water seal, caustic and cleaner tanks; for cooling in anodize tanks.

The drawing shows the location of the PLATECOIL units in an acid anodizing tank.



SHELL CHEMICAL uses PLATECOIL® in synthetic rubber reactors

Stainless steel PLATECOIL units remove heat liberated in synthetic rubber polymerization reaction at the Torrance California plant of Shell Chemical Corporation.



High efficiency, low cost per unit surface, ease of cleaning and improved agitation are cited as benefits obtained through use of PLATECOIL in this application. The PLATECOIL units were fabricated into vertical banks as indicated in the sketch.

TRANTER MANUFACTURING INC.
LANSING 9, MICHIGAN

PLATECOIL®
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ASK ABOUT Hot and Cold Combinations, pressure and bottle types—also refrigerated compartment models.

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Begins on page 224

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glass filaments, impregnated with epoxy resins and heat-cured, the pipe is non-toxic, non-flammable, and sag-proof. *Amercoat Corp.*

260—Brazing Technique called Alcres can be used to join dissimilar metals. Brazing takes place in a closely controlled furnace at about 1100-deg F. Bond is gas- and liquid-tight, resistant to thermal shocks, unaffected by fungi or high humidity. *Stewart-Warner Corp.*

261—Stainless Steel Weather-Strip prevents door binding, sticking, or slamming. Door closes easily without touching the seal until the last ¼-in. of door movement when door is sealed against even the strongest winds. Strip comes packed flat. *United Industries, Inc.*

262—High-Density Polyethylene (with a density range to 0.960) has a combination of properties that is expected to create new plastics markets. Its increased stiffness and sterilizability make the material especially useful in container and packaging fields. *Bakelite Co.*

263—Easyarc Stainless Electrodes (ac-dc) have a coating that contains chromium and nickel in powdered form. Easyarc 308, 316, 347 include superior footage per electrode, well-formed beads, smooth uniform operation, excellent restriking features. *Air Reduction Sales Co.*

264—Transparent Vinyl Plate, recently introduced, is said to be the first of its kind to offer the same wide range chemical resistance and tough physical character as the opaque unplasticized polyvinyl chloride plate. In clear yellow and emerald green. *Kaye-Tex Mfg. Corp.*

265—Key-Mix 28, a dry powdered inhibited acid blend, removes water scale, rust algae, similar deposits from boilers, condensers, air conditioning towers, etc. Dissolve it first or add it directly to your system. *Key Chemicals, Inc.*

Turn the page

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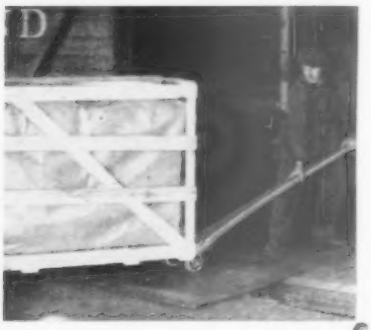

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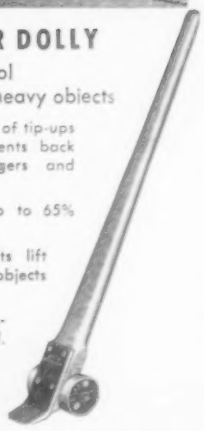

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Slashing Roof Repair Costs 30%. Specifications for five different kinds of roof repairs, aimed at keeping costs down, roofs up. **FC-3.**

FACTORY / MATERIALS NEWS

Begins on page 224

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266—Nylatron Tubular Bar is available in outside diameter ranges of 3/8- to 2-in., inside diameters from 1/4- to 1 1/2-in. New shapes are useful for close tolerance fabrication of rollers, bearings, pipe unions, gears, and other wear parts. *The Polymer Corp. of Penna.*

267—Milcor Wall Panel is the basic unit of a quickly assembled, non-load-bearing outside curtain wall. Made from steel or aluminum, panel comes complete with insulation and fastenings. Insulating factor equals that of 25-in. masonry wall. *Inland Steel Products Co.*

268—Colmonoy No. 75 is for use with maker's Sprayweld Process in applications needing exceptional resistance to abrasion. This hard-facing powder contains tungsten carbide and chromium borides; helps lengthen life of shaft sleeves, bushings, etc. *Wall Colmonoy Corp.*

269—Galvanized Structural Strip, called Cecoroll, is said to provide superior strength, weatherproofing, corrosion protection at lower cost. Strip is corrugated and has a crimped 1 1/2-in. lap flange on each side that gives it structural advantages. *Ceco Steel Products Corp.*

270—Superglas line of insulation products supplements maker's mineral wool and magnesia materials. For use on piping, ducts, other such equipment, these new products add to a line of insulations that cover temperatures from sub-zero to 2300 F. *The Eagle-Picher Co.*

271—Gat Rod Hanger Clamps were developed as a fast and economical way of installing suspended ceilings. Clamps exceed a 2-to-1 safety factor on a 200-lb. vertical design load. For use also in hanging plumbing, heating, electrical equipment. *Geo. A. Tinnerman Corp.*

272—Chemtube seamless glass-reinforced epoxy and silicone structures have high mechanical and dielectric strength at both sub-zero and ele-

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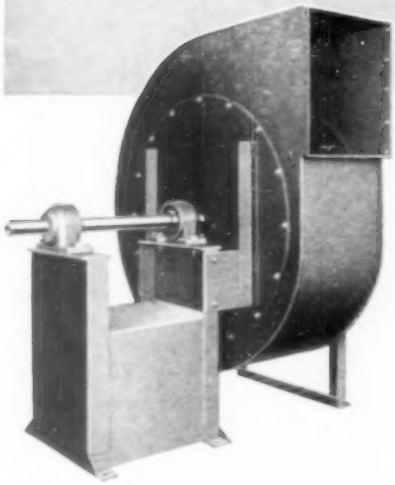
Clarage Industrial Air and Material Handling Fans



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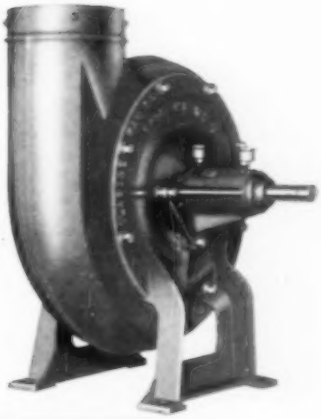

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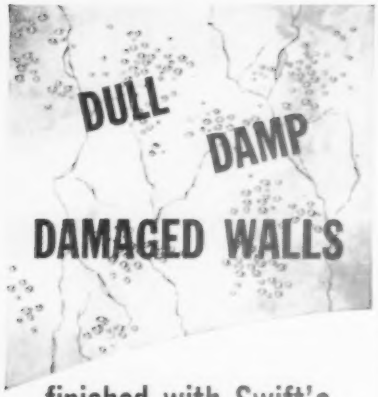

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FACTORY / MATERIALS NEWS

Begins on page 224

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vated temperatures. Produced in tubular and other forms. Surfaces allow direct application of printed circuitry. *Chemfab Corp.*

273—Keystone Brick Grease (No. 42) lubricates without processing or frictional heat. Surface film is oily, provides even lubrication without waste or drippage. Is said to reduce application time. *Keystone Lubricating Co.*

274—Morpro Plastic Floor, for wall and floor repair, is chemical-resistant. Applies to wet surfaces; will not shrink or expand. Self-contained package has mix of plastic, activator, and aggregate. *Moore Maintenance Products.*

PROTECTIVE COATINGS

275—Charcote CIC-21 is a liquid Neoprene coating with a "built-in" primer. Advantages: ease of application; resistance to fumes, impact, abrasion. *Charleston Rubber Co.*

276—One-Coat Maintenance Paint for use on porous concrete and on variety of metals. Dries in about two hours. Applies without primer to stainless steel. *Bakelite Co.*

277—Thermocone, all-weather paint, is made of graphite and silicone. Withstands thermal shock of 1000 F. range. Colors: black and aluminum. *J. Dixon Crucible Co.*

278—Anti-Rust Paint needs minimum surface preparation. Brush, spray, or dip. Nacor comes in seven colors and clear; 5-gal. cans, 55-gal. drums. *National Asphalt Corp.*

279—Sabrex is a low-cost liquid preservative to protect in-work parts. Can be "sprayed off" with an inexpensive solvent or by steam cleaning. *NaVan Products, Inc.*

280—Koldrock, all-mineral coating for low-temperature insulation solves freezer construction problem—just apply over wall insulation. *Selby, Battersby and Co.*

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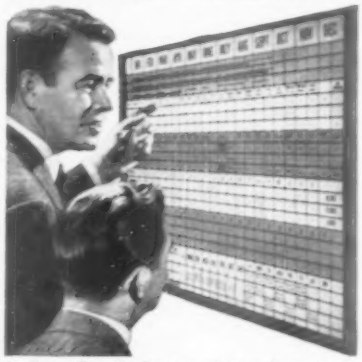

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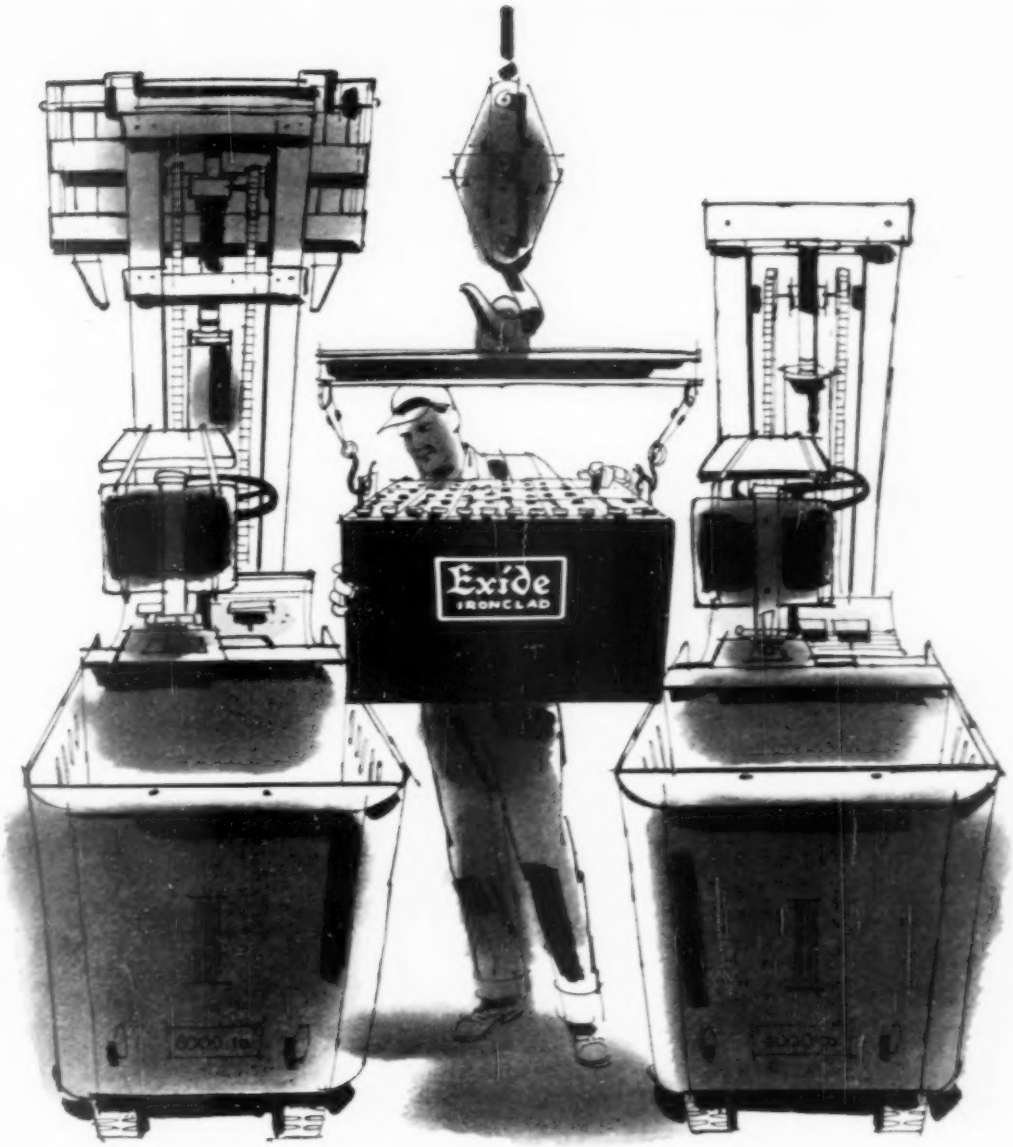

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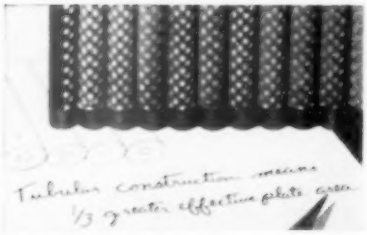

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ADVERTISERS' LITERATURE

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MAINTENANCE

346—Lubricants. Booklet: "Management Practices That Control Costs via Organized Lubrication." The Texas Co.

347—Lubricants. Free catalog of complete line of air and electric-powered lubrication equipment. Alemite Div.

348—Lubricants. Facts and data book contains a valuable treatise on lubrication. Lubriplate Div., Fiske Bros.

349—Work Platform. Circular states facts about telescoping aluminum work platform. Up-Right Scaffolds, Inc.

350—Lubricants. Illustrated bulletin available on new general-purpose oil and hydraulic fluid. Gulf Oil Corp.

351—Floor Maintenance. Free how-and-where-to-use folder for repairs on concrete floors. Master Builders Co.

352—Pipeline. Drainage Cleaner. Literature gives data on flow-line and drain cleaning machine. Kollmann Mfg. Co.

353—Slotted Angle. Brochures show simple steps needed to build frames for almost anything. Acme Steel Co.

354—Rustproofing. Report (30 pages) on rust-penetration properties of damp-proof red primer. Rust-Oleum Corp.

355—Machine Mounts. Set of "Facts" books explains features of machinery mounting pads. Unisorb Div., Felters Co.

PRODUCTION

356—Heat Transfer. Bulletin P-60 available: "How to Cut Heat Transfer Costs With Plate Coil." Tranter Mfg. Co.

357—Magnetic Drill Presses. Complete info on exclusive features and applications. Black & Decker Mfg. Co.

358—Aftercoolers. Separators. Bulletin 711 illustrates wide range of sizes and applications. R. P. Adams Co.

359—Silicone Based Paints. Brochure gives complete facts on how to improve product finishing. Dow Corning Corp.

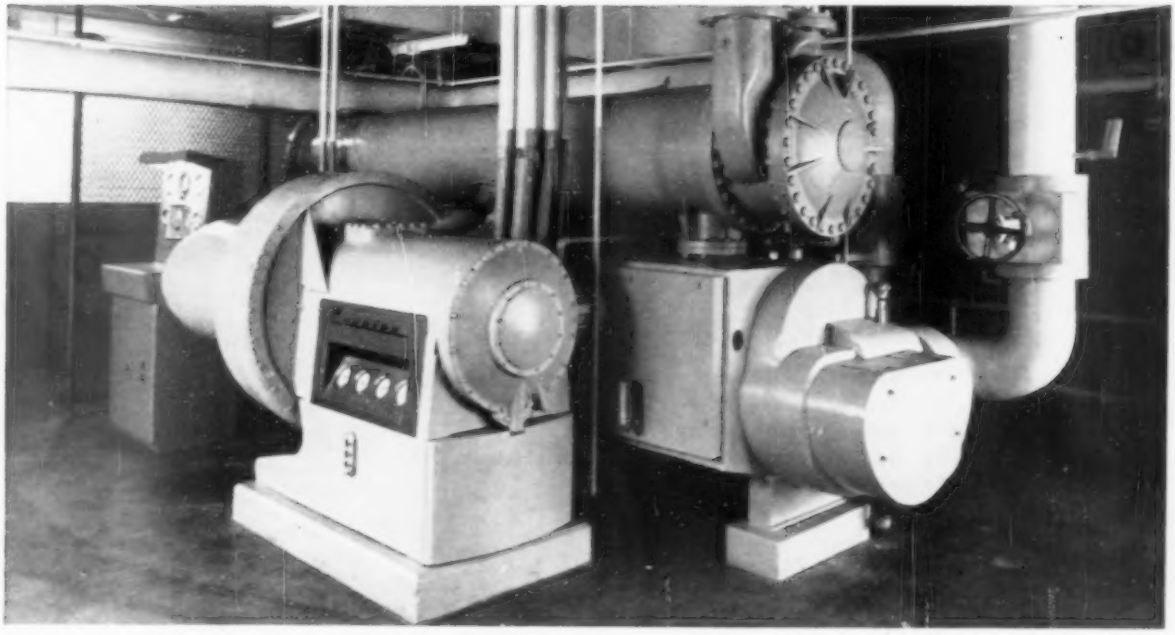
360—Adhesives. Bulletin 700 has engineering information on adhesives, coatings, sealers. Raybestos-Manhattan.

Turn the page

Carrier Hermetic Centrifugal Refrigerating Machines

now in a complete range of sizes

90 to 1100 tons



Carrier Hermetic Centrifugal Machines are available in a wide range of capacities in each size, with a choice of motor horsepowers and voltages, to meet the most exacting refrigeration load requirements in air conditioning and process cooling applications. In addition to economical selection with performance matched to specific job conditions, the Carrier Hermetic Centrifugal offers important advantages:

It combines weight savings, space savings and efficiency better than ever before achieved in a large refrigerating machine.

It runs smoothly and quietly; can be located on the roof of a building or in the basement without a heavy or costly foundation.

It operates economically. Capacity and power input are adjusted to the load, continuously, by inlet capacity vanes that are positioned, as required, by the hydraulic pressure of the lubricating oil.

It is automatic. After simple push-button starting, electronic controls provide continuous, automatic chilling of water to the desired temperature.

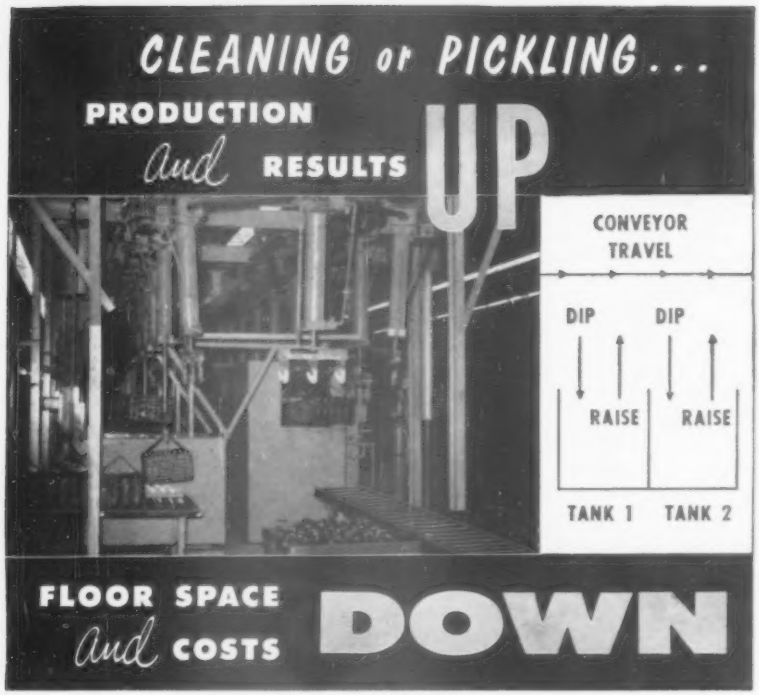
It has mechanical simplicity. The motor-compressor unit, hermetically sealed against air, moisture and refrigerant loss, is factory assembled on a single shaft.

Whatever your refrigeration requirements, there is a Carrier specialist in your area to assist you with the selection.

For detailed information about the Carrier Hermetic Centrifugal Machines, just call the Carrier district or branch office nearest you, or write to us at Carrier Corporation, Syracuse, New York.

Carrier air conditioning · refrigeration · industrial heating

For more facts circle 621 on Reader Service Card



with Cincinnati AUTOMATIC DIP-PROCESSING

If you're interested in dip-processing cleaning or pickling *in minimum space*, here's a production-proved solution that saves time, floor space and processing solutions. Straight-up, straight-down dipping of parts baskets traveling on a closed loop monorail conveyor means smallest possible tanks, important savings in floor space, too.

The operation is completely automatic, from first dip through conveyor unloading, can be used for any dip-processing sequence. In pickling processes, stainless steel, lead or rubber-lined tanks are provided.

For more information on this or a complete range of equipment for metal cleaning and finishing, write to:

Cincinnati CLEANING & FINISHING MACHINERY CO.
2021 HAGEMAN STREET, CINCINNATI 41, OHIO

Use handy coupon for detailed literature

Monorail belt, drum or special types:

- **Complete Finishing Systems**
- **Washing Machines**
- **Phosphatizing Machines**
- **Ovens**
- **Paint Application Equipment**
- **Soap Coating Machines**

CINCINNATI CLEANING & FINISHING MACHINERY CO.
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Send ( ) information on _____

( ) Complete catalog

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Firm _____

Address _____

City _____ Zone _____ State _____

ADVERTISERS' LITERATURE

Begins on page 234

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

361—Magnetic Separators. Fact-filled booklet (48 pages) shows varied applications of equipment. Eriez Mfg. Co.

362—Power Tools. Available on request: illustrated catalog on complete line of industrial tools. Mall Tool Co.

363—Induction Heating. Bulletin: "Typical Results of Induction Brazing and Soldering." Ohio Crankshaft Co.

364—Tool Control. Free booklet: "How Tool Costs Were Cut 12 Ways in 20 Plants." McCaskey Industrial Div.

365—Schedule Board. Bulletin X-100 shows varied practical applications of visual control board. Graphic Systems.

366—Threading, Tapping. Send for Catalog A-405 for data on automatic bar machines. Greenlee Bros. and Co.

MATERIALS HANDLING

367—Storage Racks. Bulletin 700-A shows how racks will double your storage capacity. Frick-Gallagher Mfg. Co.

368—Conveyors. Literature suggests how to tool up for efficient materials handling. Rapids-Standard Co., Inc.

369—Floor Trucks. Catalog T-54 describes in detail line of trucks and applications. The Fairbanks Co.

370—Conveyors. Literature covers overhead cable conveyors for varied applications. E. W. Buschman Co.

371—Rails, Track Equipment. Free descriptive catalogs and ordering guides ares now available. L. B. Foster Co.

372—Casters, Wheels. Manufacturer offers literature on non-rusting and non-corroding types. Darnell Corp.

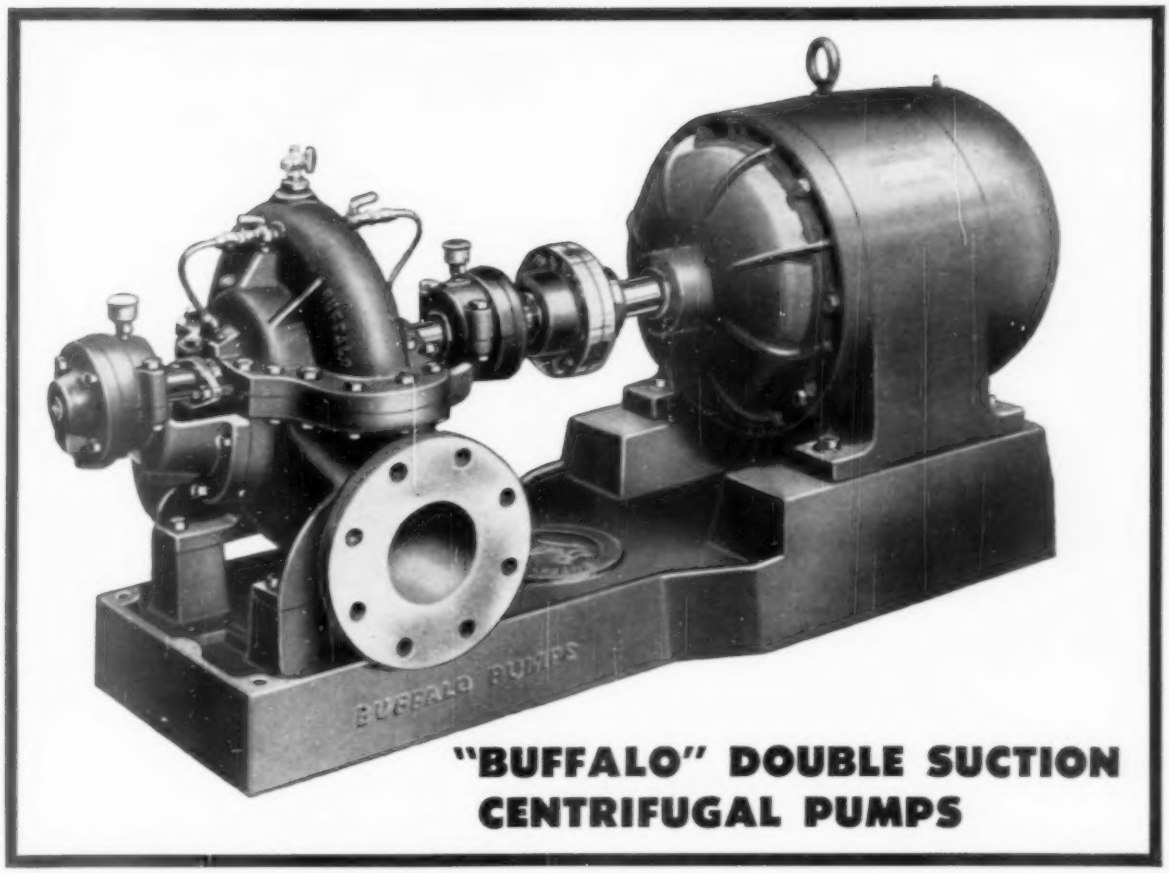
373—Cranes. Bulletin (16 pages) on: "The Why and How of Faster Production." Reading Crane & Hoist Corp.

374—Air Hoist. Bulletin 80 describes feature and application. Capacities: 150 lb. to 2 tons. Gardner-Denver Co.

375—Storage Racks. Complete catalog describes varied fabricated shapes available. Equipment Mfg., Inc.

376—Scales. Catalog provides features and specifications of standard and special types. The Howe Scale Co.

Turn the page



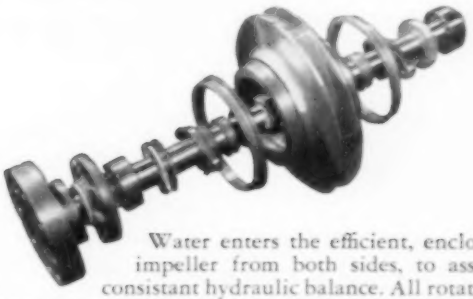
OFFER MORE FOR YOUR PUMP DOLLAR

- Long Life
- High Efficiency
- Quiet Operation
- Reliability
- Minimum Down Time for Repairs
- Availability of Replacement Parts

"Buffalo" Pumps' engineering and rugged, dependable construction make them highly desirable for demanding industrial service. For example, "Buffalo" Double Suction Pumps for dependable clear water service feature precision-machined casings with ample water passages — impellers designed for highest efficiencies — bronze wearing rings — sturdy shafts and heavy-duty ball bearings.

The complete line of "Buffalo" Double Suction Pumps, in capacities from 10 to 14,000 gpm, assures the pump that's tailored to *your* clear water moving needs — *exactly*. For full information, contact your nearby "Buffalo" Engineering Representative, or write for Bulletin 955-R.

Value Beneath the Surface . . . the impeller and shaft assembly of the "Buffalo" Double Suction Pump.



Water enters the efficient, enclosed impeller from both sides, to assure consistant hydraulic balance. All rotating elements are carefully-balanced prior to assembly.

The value "bonus" in every "Buffalo" Pump is the "Q" Factor — the built-in QUALITY which assures trouble-free satisfaction and long life.

"Buffalo" PUMPS

BUFFALO PUMPS

DIVISION OF BUFFALO FORGE CO.

471 Broadway • Buffalo, N. Y.

Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

For more facts circle 623 on Reader Service Card

BUSCHMAN EWB CONVEYORS

Every Way Better for Every Industry

Overhead cable and roller conveyors are used in this wholesale drug warehouse to speed up order picking.

6000 chickens per hour move from coop to consumer, by overhead cable conveyor at this new poultry processing plant.

Buschman *Bush-Lock Design*

OVERHEAD CABLE CONVEYORS

Low initial cost . . . trouble-free operation . . . outstanding versatility . . . every advantage is yours with Buschman Cable Conveyors, industry's first choice for everyday transportation of light and medium loads.

Whatever your materials handling problem, Buschman "on the job" engineering know-how assures an installation that is every way better. Make low-cost production a reality, consult Buschman.

Cable conveyors carry light to medium weight loads through all operations at convenient heights in this modern manufacturing plant.

Complete Conveyor Systems for all types of industries . . . Engineered, Manufactured, Installed.

Every Way Better EWB

Write today for literature.

C-345-EWB

THE E. W. BUSCHMAN CO.
4425 Clifton Avenue, Cincinnati 32, Ohio

ADVERTISERS' LITERATURE

Begins on page 234

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

377—Storage Racks. Catalog lists racks available in over 800 sizes and capacities. American Metal Products Co.

378—Trucks. Brochures: "Gas vs. Electric Trucks," "LP-Gas vs. Electric Trucks." Elwell-Parker Electric Co.

379—Safety Cans. Catalog describes complete line of safety containers for oil and gasoline. Eagle Mfg. Co.

PLANT SERVICES

380—Dust Collectors. Descriptive literature now available on 37 standard models ready to use. Aget Mfg. Co.

381—Ventilators. Bulletin 3720-A describes features of packaged belted vent sets. Buffalo Forge Co.

382—Coooling Towers. Catalogs 311 and 361 cover cooling towers, evaporative coolers. Acme Industries, Inc.

383—Dust Collectors. Bulletin 52A, free upon request, gives full facts and figures. Metals Disintegrating Co.

384—Air Conditioning. Bulletin 135, "Air Engineering," gives complete data and applications. Niagara Blower Co.

385—Plastic Piping. Catalog describes features and anti-corrosive properties. Colonial Plastics Mfg. Co.

386—Disinfectant. Now available: Literature on multi-purpose industrial cleaning disinfectant. C. B. Dolge Co.

387—Compressors. Bulletin CRC-10 gives complete details, describes mechanical features. Gardner-Denver Co.

388—Air Conditioning Controls. Booklet S-103 describes centralized pneumatic control system. Johnson Service Co.

389—Weed Killer. New book, "Plant Site Vegetation Control," is free upon request. The Dow Chemical Co.

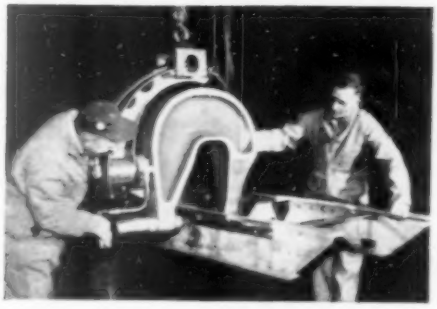
390—Two-Way Radio. Case-history portfolio tells of successful results in 45 typical companies. Motorola, Inc.

391—Dust Control. Catalog (40 pages) contains data and valuable reference material. Dracco Div., Fuller Co.

392—Showers. Catalog 5601 gives complete details, specifications, applications. Bradley Washfountain Co.

Turn the page

CP COLD RIVETING



CP Hydraulic Cold Riveting equipment really puts the "squeeze" on assembly time and cost. Cold rivets are easier to handle . . . you can preload rows of rivets at a time to speed assembly. Holding power is consistent because there is no strength variation due to underheating or overheating. And you save manpower — there's no waiting for rivets to heat, no forge equipment or crew required. Cold rivets completely fill the holes . . . rivets don't work loose later. Unequal expansion and shrinkage problems are completely eliminated due to cold driving and pressure control. Hydraulic yoke locates quickly on the work—crescent suspension bail has universal swivel joint and counter-balance for fast positioning. For detailed information write: *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

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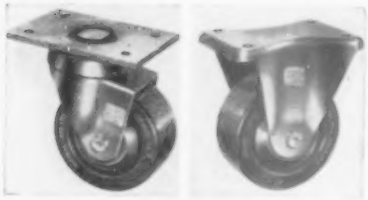
You Can

save money from first day of installation



DARNELL CASTERS WITH PHENOLIC (DARNELLOPHEN) WHEELS

- No rusting or corroding
- Non-marking
- Quieter rolling
- Will stand temperatures up to 200° F.
- High impact strength
- Resist oils, greases and most chemicals
- Wheels have beveled edges—protect floors better.

Send for Free Literature

Look in the **YELLOW PAGES** under **CASTER & WHEELS**

DARNELL CORPORATION, LTD.
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36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

ADVERTISERS' LITERATURE

Begins on page 234

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

393—Space Heaters. Bulletin 564, now available, describes complete line of space heaters available. Dravo Corp.

394—Communications. Information booklet describes closed-circuit telephone system for plant uses. Dukane Corp.

ELECTRICAL

395—Motor Controls. Bulletins 6584, 4979, 3856, 6331 on starters, control, power centers. General Electric Co.

396—Motors. Bulletin 2300, available on request, gives complete data for new immersible motor. Louis Allis Co.

397—Cable. Bulletin DM5606 on Duralox cable and its uses is yours for the asking. Anaconda Wire & Cable Co.

398—Starter. Bulletin 8536 describes mechanical features of new vertical action starter. Square D Co.

399—Motor Starter. Bulletin 8121 covers new 2300-volt motor starter. Electric Controller & Mfg. Co.

400—Productive Maintenance. Bulletins GEA-6087 and GED-3278 explain plant-wide program. General Electric Co.

401—Conductor Systems. Catalog describes mobile electrification-system cranes, monorails. Insul-8-Corp.

402—Controls. Bulletin GEA-6603 gives details on application of automatic control system. General Electric Co.

403—Lighting. Manual (48 pages) on advantages and principles of good lighting practices. Champion Lamp Works.

BUILDINGS

404—Washrooms. Information available on planned protective sanitation program. West Chemical Products, Inc.

405—Flooring. Descriptive folders on vinyl floor tile give colors, sizes, thicknesses. Azrock Floor Products Div.

406—Smokestacks. Bulletin gives cost-cutting facts on installation of glass-protected stacks. A. O. Smith Corp.

407—Rolling Steel Doors. Catalog G-58 describes manually, mechanically, electrically operated types. R. C. Mahon Co.

408—Washrooms. Booklet contains diagrams, illustrations, and ideas on washroom advisory service. Scott Paper Co.

Turn the page

A HANDY CHECKLIST OF PROFITABLE READING

☐ MANAGEMENT AND ORGANIZATION

Just Published—Describes in step-by-step detail the methods and techniques by which companies may improve the quality of their professional management and tailor their organizations to meet growing competition. Based on one of the most comprehensive studies of business ever undertaken. By **L. A. Allen**, Management Consultant. **360 pp., 6 x 9, illus., $7.00.**

☐ HUMAN ENGINEERING

Shows how to adapt equipment, systems, and work conditions for top employee efficiency. You are shown how workers react to light, sound, color, and other critical factors. Scores of practical suggestions are given for bringing out the best employee performance. By **E. J. McCormick**, Purdue University. **467 pp., 6 x 9, 202 illus., $8.00.**

☐ PRODUCTION PLANNING AND INVENTORY CONTROL

Just Published—Explains new concepts in processes of inventory control and production planning, along the lines of operations research thinking. Discusses policies and costs that affect inventory and production planning decisions. By **J. F. Magee**, Arthur D. Little, Inc. **338 pp., 6 x 9, illus., $7.50.**

☐ THE EFFICIENT EXECUTIVE

Gives tested methods for working more effectively under today's pressure. How to put yourself over with both superiors and subordinates, handle conferences, reduce paper work, delegate responsibilities, etc. Full of human interest stories and self-check tests. By **A. Uris**, Research Institute of America. **308 pp., 5⅝ x 8, illus., $4.95**

☐ MENTAL HEALTH IN INDUSTRY

Just Published—Thoroughly practical, non-technical discussion of personality problems and personality characteristics in industry—from management to hourly workers. Particular attention given to the handling of emotionally disturbed employees by management. By **A. A. McLean**, Psychiatric Consultant, Int. Bus. Machines Corp.; and **C. C. Taylor**, McGill University. **262 pp., 5⅝ x 8⅝, $6.50.**

SEE THESE BOOKS 10 DAYS FREE

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Send me books checked below for 10 days' examination on approval. In 10 days I will remit for books I keep, plus few cents for delivery costs, and return unwanted books postpaid. (We pay delivery costs if you remit with this coupon—same return privilege.)

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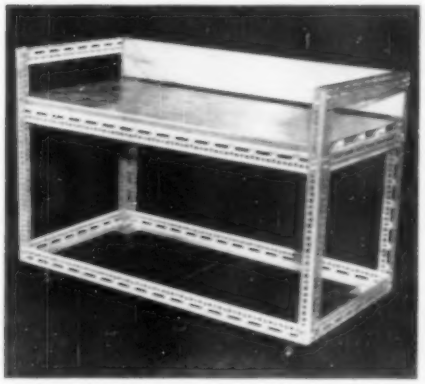
For price and terms outside U.S., write McGraw-Hill Int'l., N.Y.C. Fac-6

Dexion Slotted Angle provides sturdy frame for parts table.



Dexion Slotted Angle and Dexion Casters make up into handy rolling cart.

Dexion Slotted Angle frames production assembly tables with conveyors.

You Cut Man-hours and Expense Each Time You Cut ACME STEEL Dexion Slotted Angle

You Can Frame Almost Anything Faster, Easier and at Less Cost with this New Basic Framing Material

Cut and bolt. That's all there is to building with Dexion Slotted Angle.

You don't need skilled labor. Or machines or special preparation. Or welding or drilling.

The Dexion Cutter and an ordinary wrench are all that's required.

Dexion Slotted Angle is made of cold-rolled, galvanized steel. Its system of slots and holes *always* matches up for strong, stand-up-and-take-it assemblies.

Dexion Slotted Angle is sold in 10-piece packages of 10 or 12 foot lengths, with 75 nuts and bolts per package.

Use Dexion Slotted Angle for permanent or temporary structures—it is completely re-usable.

FREE: to learn how others have saved time, man-hours and money by building with Dexion Slotted Angle, send for the "Dexion Idea Book" and the "Dexion Speed Framing Accessories" folder. These brochures illustrate the simple steps it takes to build frames for almost anything with Dexion Slotted Angle. Write to Dept. FAD-68, Acme Steel Company, Chicago 27, Illinois.

ACME STEEL DEXION SLOTTED ANGLE

For more facts circle 627 on Reader Service Card

This BROOK A.C. MOTOR is a Weather Profit!

Peak performance in all climates—humid or arid—high or low temperatures. You profit in any weather with this husky, totally enclosed, fan cooled BROOK MOTOR. Yet, it actually costs less than an ordinary, light duty motor. Slip Ring or Squirrel Cage type, 1 to 600 H.P., ready for shipment from warehouse stocks in major industrial centers. Send for brochure and name of your local Brook Dealer.

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3553 W. PETERSON AVE., CHICAGO 45, ILLINOIS

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KELLOGG dial "9" intercom

a NEW way to cut communication costs!

Is yours a small business? A medium size organization? If yes, Kellogg's Dial 9 Intercom is made for you. Dial 9 is generous with its services, but miserly about spending your money. In fact, for pennies a day, Kellogg's budget-minded intercom brings up to nine persons or departments within touch instantly . . . without leaving their desks or stations! Consider these points in favor of Kellogg Dial 9: low initial cost . . . reduces need for rental equipment . . . completely bypasses switchboard and operator . . . leaves outside lines free for doing business . . . Kellogg's exclusive warranty. *Write* today.

Where larger systems are required, ask for facts on Kellogg Select-O-Phone or KMG

KELLOGG SWITCHBOARD AND SUPPLY CO.
Commercial Products Division, Dept. FM68
6650 S. Cicero Avenue, Chicago 38, Illinois

A Division of International Telephone and Telegraph Corp.

KELLOGG ITT

ADVERTISERS' LITERATURE

Begins on page 234

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

409—Tread Plate. Data on application, design, and fabrication of abrasive tread plate. Aluminum Co. of America.

MISCELLANEOUS

410—Reproduction Materials. Free copy of booklet on Kodagraph reproduction materials. Eastman Kodak Co.

411—Safety Gloves. New catalog lists full line and sizes of neoprene gloves for varied uses. Pioneer Rubber Co.

412—Chain Drives. New 100-page catalog includes engineering section with diagrams. Acme Chain Corp.

413—Filters. Folder on new Model WH Fulflo Filters engineered to exact requirements. Commercial Filter Corp.

414—Graphic Instruments. Catalog Section 42 lists capacities and describes applications. Esterline-Angus Co.

415—Work Gloves. Free catalog lists complete line of gloves for specific applications. Hood Rubber Co.

416—Speed Reducers. Booklet 2651, available on request, describes in-line helical gear drives. Link-Belt Co.

417—Vessels and Containers. New catalog lists complete line of food service equipment. Wear-Ever Aluminum, Inc.

418—Chain Drives. Booklet 2425 (88 pages) describes mechanical features and applications. Link-Belt Co.

Now You Can Get Free File Copies . . .

. . . of selected FACTORY articles, especially suited for your reference files. They are available via the Reader Service Card, next to the back cover. Card carries a descriptive list of free File Copy titles. To take advantage of this brand-new service to FACTORY readers, circle the appropriate numbers on the Reader Service Card, tear out the card, drop it in the nearest mailbox. We'll send you one free copy of each title you want as long as our supply lasts. And we'll announce new File Copy titles next month.

For more facts circle 629 on Reader Service Card

"Gentlemen, I understand one-at-a-time lamp replacement is disrupting some of our departments!"

Lamps burn out. Someone has to replace them. This takes time, costs money, interrupts labor *and* management.

But General Electric's Group Relamping Plan solves this problem. Every 12-24 months, maintenance men, working after hours, change *all* your lamps, dead or alive. New lamps go in—on a fast production basis.

At Brown Shoe Company's office in St. Louis, one-at-a-time lamp replacement used to take 20 minutes per lamp. Group Relamping cuts that time to 3¾ minutes per lamp, saves $500 each year. And the whole place looks cleaner and brighter.

Remember: the labor cost of replacing lamps one-at-a-time usually exceeds the lamp price itself.

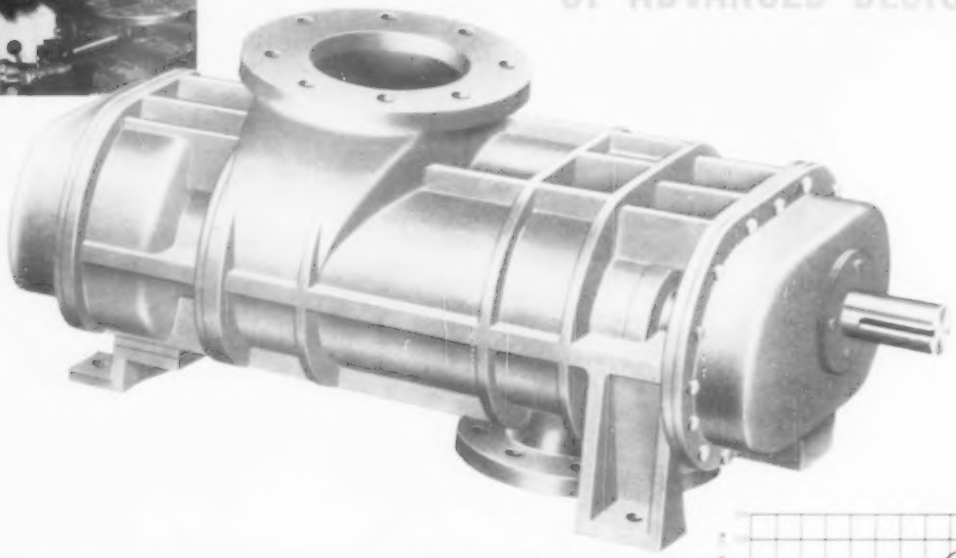
Compare your costs and see how Group Relamping fits into your plant, office or store. Call in your local G-E Lamp Specialist for suggestions or send for your free Group Relamping folder. Write: General Electric Co., Large Lamp Dept. FMM-68, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 630 on Reader Service Card

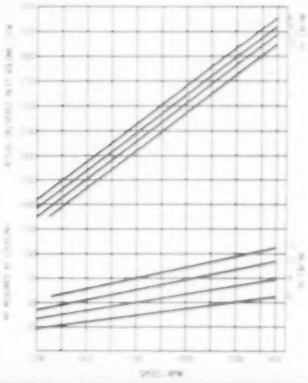
U.S.HOFFMAN ANTICIPATES INDUSTRY'S NEEDS WITH NEW CYCLOBLOWER OF ADVANCED DESIGN!



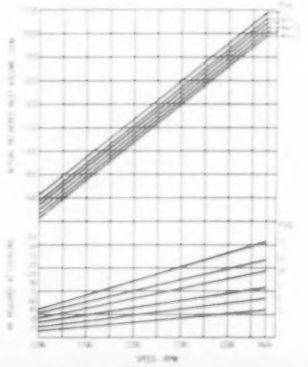
After years of advanced engineering research and on-the-job performance tests, CycloBlower, a new axial flow positive displacement blower or exhauster has been added to U.S.Hoffman's equipment line in keeping with the company's policy of anticipating industry's needs.

Operating on the principle of interruption of rotor seal continuity without sacrificing the benefits of perfectly symmetrical rotor forms, the CycloBlower offers numerous advantages over other blowers or exhausters including:

1 **Elimination of runout or trapped pocket effect**
2 **Clean air or gas delivery**
3 **Efficient, shock-free compression**
4 **High capacity—low unit weight**
5 **Installation flexibility**
6 **Efficient, dependable operation**



REPRESENTATIVE VACUUM PERFORMANCE CURVE



REPRESENTATIVE PRESSURE PERFORMANCE CURVE

HOFFMAN CYCLOBLOWERS . . .
for tough service demands

Hoffman air appliance engineers will be glad to make a survey of your blower-exhauster needs. No obligation, of course. Write for information.

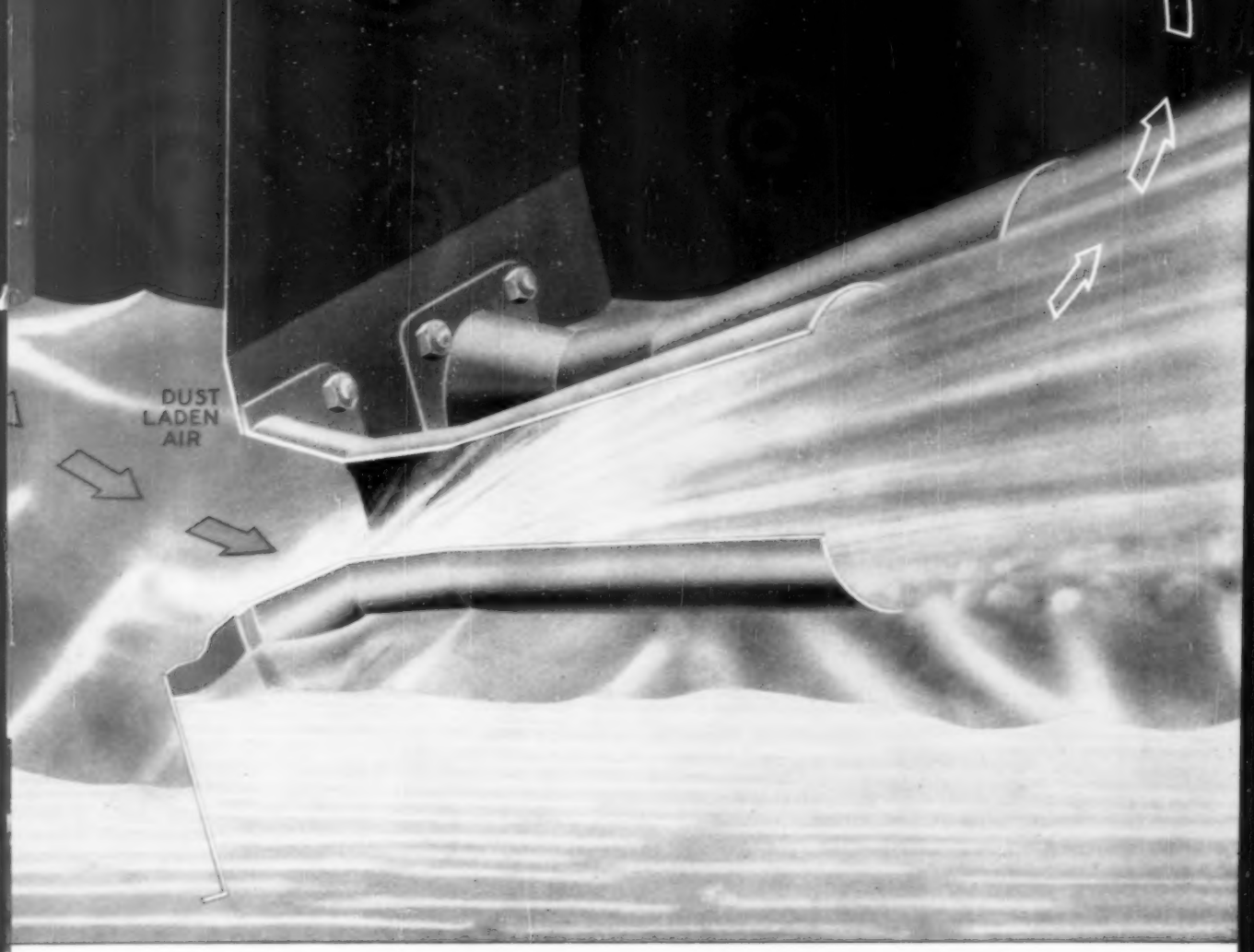
AIR APPLIANCE DIVISION

U.S.HOFFMAN MACHINERY CORP.

103 FOURTH AVENUE, NEW YORK 3, N. Y.

For more facts circle 631 on Reader Service Card

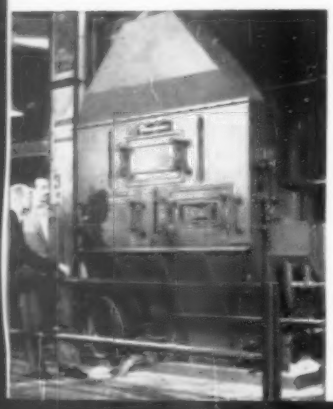
IT PAYS TO STANDARDIZE ON **STANSCREW**



Puts the squeeze on difficult dusts

Pangborn Ventrijet Wet Dust Collector uses exclusive venturi tubes for peak efficiency

Pangborn Ventrijet Wet Dust Collector on the job. This is just one of Pangborn's comprehensive line of wet and dry dust collectors.



That pinch-necked venturi tube is the secret behind Pangborn Ventrijet performance. As dust-laden air flows through these tubes, the constriction creates a low-pressure area which draws water into the air stream. The resulting turbulence breaks the water into particles which actually *wash* the dust from the air. The simplicity of Ventrijet design saves money in its ease of installation, its low cost of operation and maintenance.

Although the Ventrijet is particularly suited to collecting hot, moist, inflammable, corrosive and obnoxious dusts, the Pangborn engineering it typifies is important to *any* dust-producing plant. It is not enough to put a dust collector within a plant. An efficient dust control system must be *scientifically* planned, designed and constructed to handle effectively a specific dust problem. This thinking is incorporated into every Pangborn proposal.

The Pangborn Engineer in your area will be glad to go to work for you. He is a dust expert *and will discuss your individual problem at no obligation. And, for more information, write for Bulletin 922 to:* Pangborn Corp., *2100 Pangborn Blvd., Hagerstown, Md. Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS DUST

For more facts circle 632 on Reader Service Card

. . . Your best motor investment is Century

IT PAYS TO STANDARDIZE ON **STANSCREW**

Stanscrew service helps insure quality for new Tuthill pump

Marvin Williams, Works Manager, Tuthill Pump Company, says: "Dependable, precision-built fasteners are an essential ingredient of the quality we build into Tuthill Pumps.

"Therefore, when we designed our new series of high pressure Powermax pumps, we had our distributor arrange for a visit from Stanscrew's fastener specialist. The socket head cap screws he recommended for this demanding application met the stringent standards we have established. And because of our years of experience with Stanscrew, we know we can count on precise product uniformity and fast service."

Hundreds of other leading companies in American industry have also learned that it pays to standardize on Stanscrew. For Stanscrew offers a comprehensive line of over 4,000 different types and sizes of standard fasteners . . . including a complete selection of socket, set, and cap screws. These are produced in three modern plants by fastener specialists with over 85 years of specialized experience. All 4,000 items are always in stock . . . quickly available.

When you have a fastener problem, call your Stanscrew distributor. He will arrange for a prompt visit from the Stanscrew fastener specialist. The specific recommendations he will make can often mean important savings.

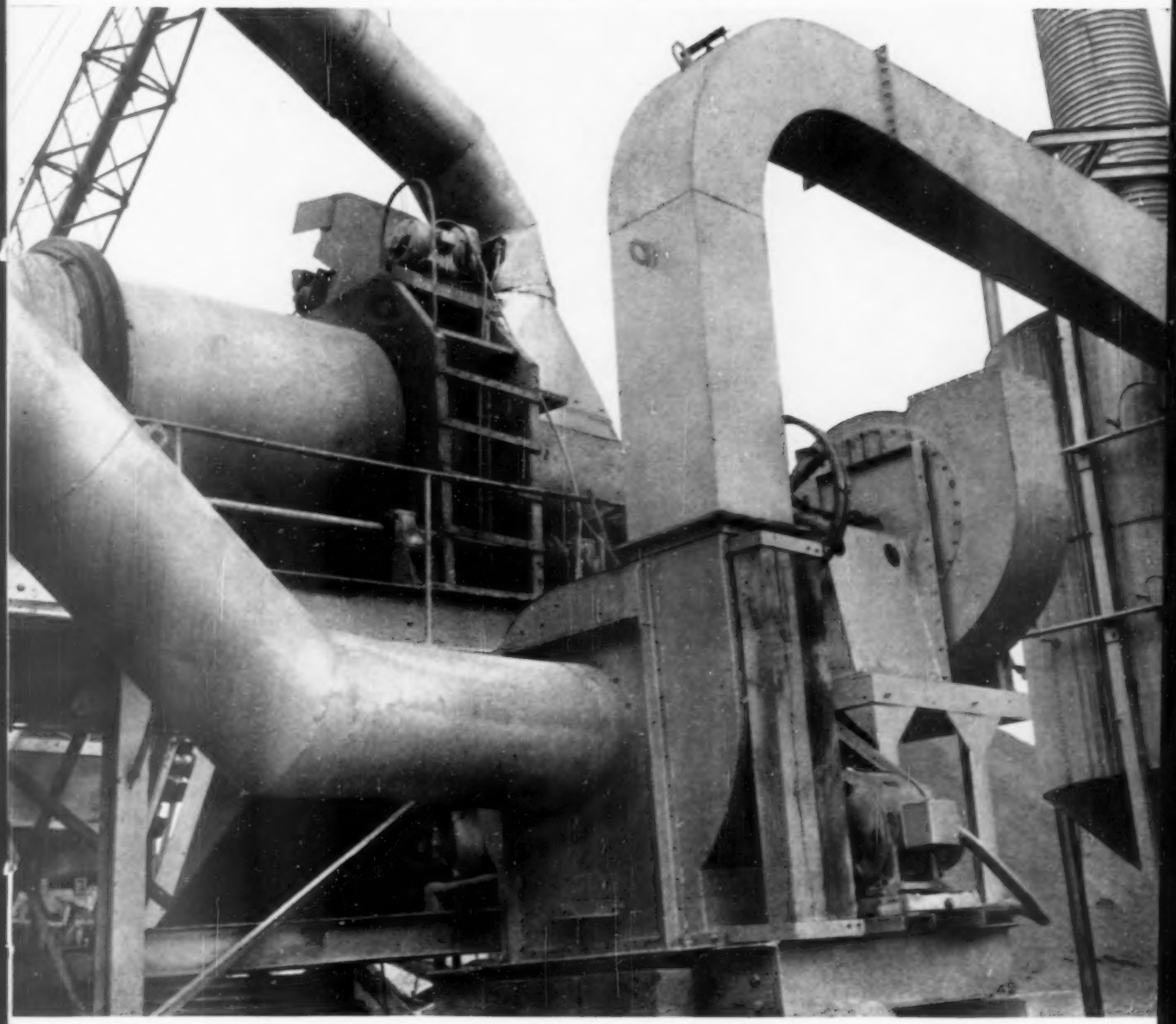
STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

For more facts circle 633 on Reader Service Card

. . . Your best motor investment is Century



Out in the weather or inside the plant . . . use Century Motors

Century electric motors are engineered to handle the roughest, toughest kind of industrial service. Industry specifies Century motors—from 400 HP to 1/20 HP—for long-hour duty on exacting jobs.

Out in the weather or inside the plant, Century motors maintain their reputation for dependable performance. You get the power you need to keep production rolling, trim maintenance costs, cut needless down-time.

Your best motor investment is Century. Century's complete line enables you to select the right motors for the work you have to do. Call your local Century man or Authorized Century Distributor. Find out how Century motors will meet your needs.

Century MOTORS

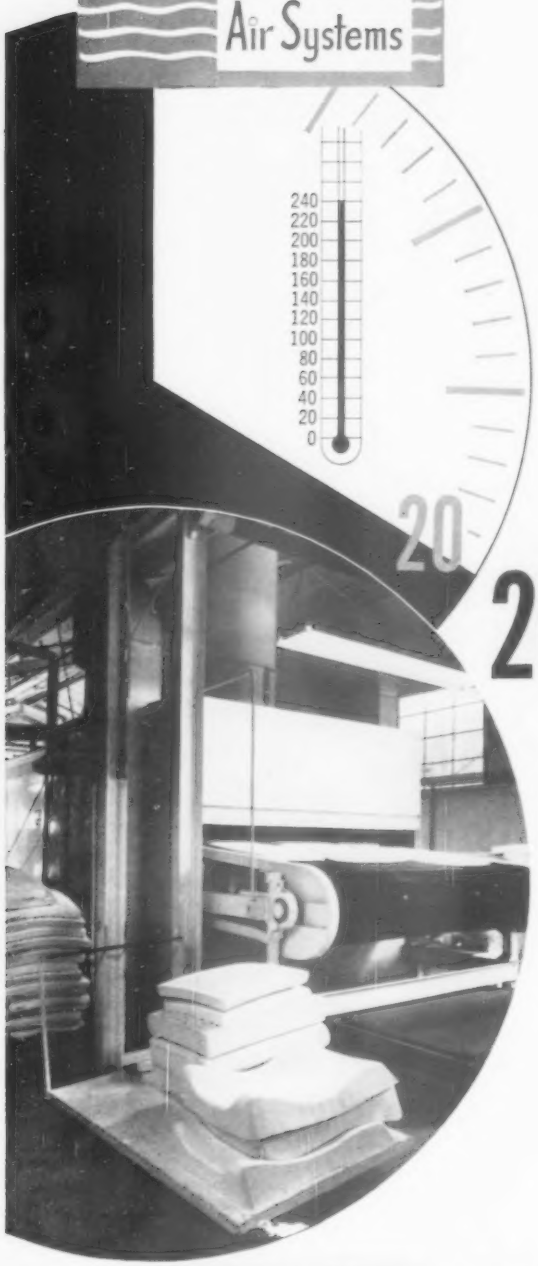
CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri • Offices and Stock Points in Principal Cities

For more facts circle 634 on Reader Service Card

ROSS Air Systems

Engineered Atmospheres for Better Processing



This refers to a foam rubber processing installation . . . a 65 foot long by 8 foot wide Ross Continuous Dryer and Curing Unit for drying C-Foam mattresses, furniture and aircraft cushions at the American Latex Corp. plant, Hawthorne, California.

Twenty minutes of the 45 minutes total continuous processing time are critically important because it is the curing period. Here is where the carefully conceived and controlled 'Engineered Atmosphere' comes into the picture. The temperature in this zone has to be held very close to 240°F by specially designed introduction, circulation and exhausting of hot air. Timing of travel has to be just right.

20 critical minutes at 240°F

Approaching the discharge end comes a complete reversal . . . a cooling zone, where residual hot spots, which could cause spontaneous combustion of the material in storage, are eliminated by the controlled introduction and circulation of cool air.

In this installation, there are at least four important elements of an 'Engineered Atmosphere': zoning, circulation of hot air, temperature control and cooling . . . all precision problems. Drying, curing, baking, impingement, heating, cooling . . . these are typical of the operations on which Ross Engineers have concentrated their skills for more than thirty-seven years.

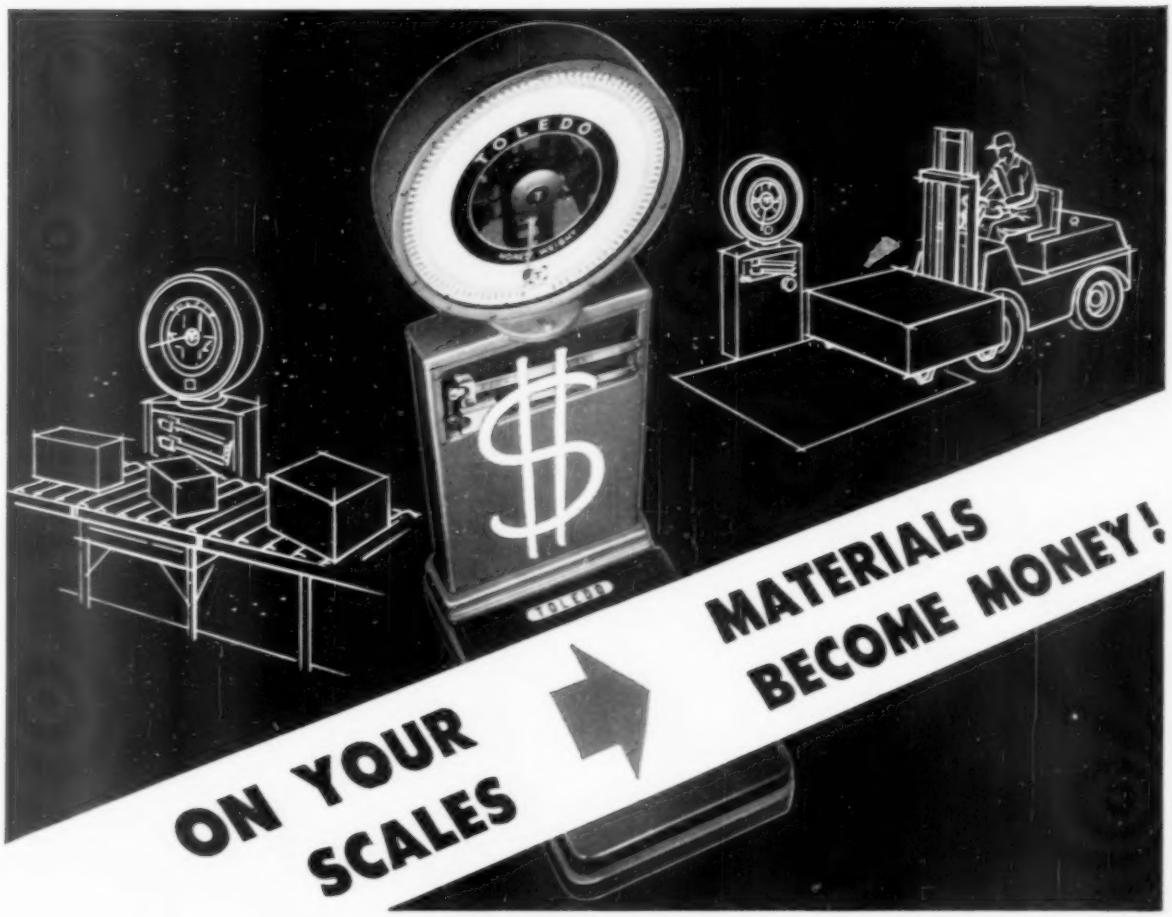
THE MIDLAND-ROSS GROUP OF COMPLEMENTING SERVICES

J. O. Ross Engineering, New York
John Waldron Corporation, New Brunswick, N. J.
Andrews and Goodrich, Boston
Ross Engineering of Canada Limited, Montreal
Ross Midwest Fulton, Dayton
Hartig Extruders, Mountainside, N. J.
Carrier-Ross Engineering Company, Ltd., England

J. O. ROSS ENGINEERING DIVISION

Midland-Ross Corporation
444 Madison Avenue, New York 22, N. Y.
ATLANTA • BOSTON • CHICAGO
DETROIT • LOS ANGELES • SEATTLE

For more facts circle 635 on Reader Service Card



It will pay you to check up on weighing efficiency in your plant!

For proper cost control, efficient weighing is a prime requirement. Weight records directly affect costs, quality, inventory control and customer billing. You can avoid weighing errors and inadequate weight data by placing the right scales in the right places . . . all properly integrated in a *plant-wide weighing system* to supply basic accounting records on materials received, transferred and shipped. You can easily check up on the job your scales are now doing. Just ask for the exclusive Toledo Weight Fact Kit. A Toledoman will gladly explain how it will help you detect and correct weighing inefficiencies in your plant. REQUEST YOUR WEIGHT FACT KIT NOW. No obligation. Address Toledo Scale, 1401 Telegraph Road, Toledo 12, Ohio.

SERVICE

TOLEDO SCALE

Headquarters for Weighing Systems

DIVISION OF TOLEDO SCALE CORPORATION

FLOOR AND TRUCK SCALES

BENCH AND PORTABLE SCALES

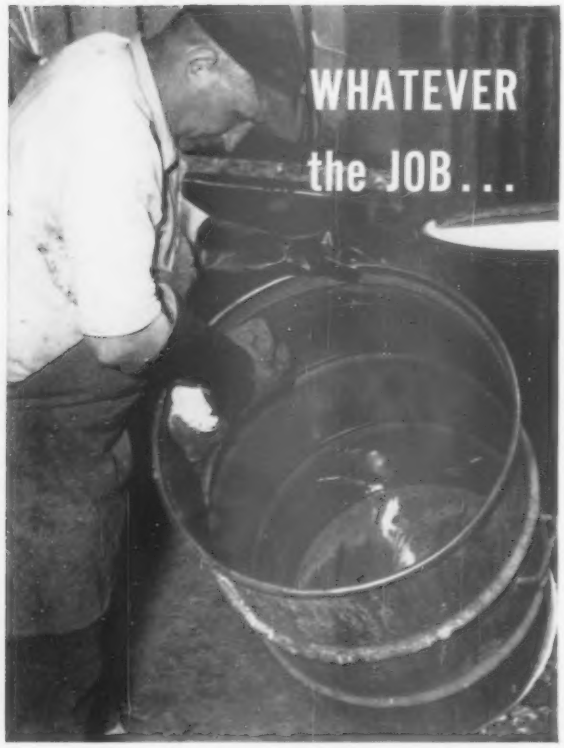
OVER-UNDER SCALES

REMOTE DIGITAL WEIGHT RECORDING

OVERHEAD TRACK SCALES

COUNTING SCALES

For more facts circle 636 on Reader Service Card



There's a HOOD Glove that fits it best

NO. 7703 NEOPRENE COATED 14½" industrial weight with natural-fit fingers. One of 29 different styles.

Every handling job involves certain elements such as heat, cold, abrasion, acids, and alkalies. No one glove can successfully handle all these conditions. That's why HOOD makes 29 different kinds of rubber, neoprene and plastic work gloves. Each one is specially designed to do a particular kind of work.

Hood's famous Glove Guide takes the guesswork out of glove selection. Its "wear test" performance chart helps you choose the most economical glove for every job. Send for your free copy today.

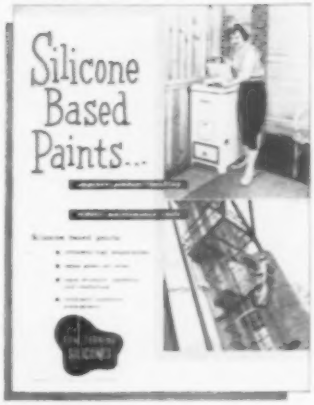
HOOD RUBBER CO.,
a division of B. F. Goodrich Company
WATERTOWN, MASS.
RUBBER • NEOPRENE • PLASTIC INDUSTRIAL GLOVES

For more facts circle 637 on Reader Service Card

get the facts on Silicone Based Paints

... to improve product finishing
... reduce maintenance costs

Send for this brochure and list of leading manufacturers of paints formulated with Dow Corning Silicones.



first in silicones

Address Dept. 516
Dow Corning Corporation
MIDLAND, MICHIGAN

For more facts circle 638 on Reader Service Card

Save Time...
Have Lasting Concrete Repairs

Patching concrete floors. Tuck pointing masonry.

Ready-to-Use, **NON-SHRINK EMBECO PRE-MIXED MORTAR**

... Eliminates assembling, proportioning of materials. All ingredients accurately proportioned, thoroughly blended.

... Provides durable repairs because it (1) does not shrink upon hardening, (2) bonds tightly to old concrete and mortar, (3) has higher early and ultimate strength, (4) is dense, resists water and oil penetration.

FREE how-and-where-to-use folder. Write for it.

DIVISION OF AMERICAN-MARIETTA COMPANY
the MASTER BUILDERS co.
CLEVELAND 3, OHIO TORONTO 9, ONTARIO

For more facts circle 639 on Reader Service Card

STOP THIEVES WITH "BLACK LIGHT!"

Ideal burglar protection for spacious areas at a reasonable cost, the transistorized Kidde Photo-Electric Burglar Alarm System uses an invisible beam of "black light," is completely tamper-proof, requires no special wiring. It can be installed simply and easily by one man. For more information about this new, U.L.-approved protection, send the coupon or write to Kidde today!

Kidde

Walter Kidde & Company, Inc.
632 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd.
Montreal — Toronto — Vancouver

Walter Kidde & Company, Inc., 632 Main St., Belleville 9, N. J.
Send me your Photo-Electric Burglar Alarm Data Sheet U-2.

NAME _____

ADDRESS _____

CITY _____ STATE _____

For more facts circle 640 on Reader Service Card

the extra advantages* of

motorpump versatility

EVERY TIME YOU SPECIFY an Ingersoll-Rand Motorpump you're helping to insure profitable production. Dependable pumping efficiency is designed into Motorpumps right from the start. And special features engineered by Ingersoll-Rand mean year-after-year operation at minimum costs.

You can be sure there is an I-R Motorpump to solve your particular pumping problem, because Motorpumps are available in the widest range of sizes and types. You get delivery from 5 to 2800 gallons per minute, with heads up to 650 ft., horsepowers range from 1/4 through 75.

Get the full story on how I-R Motorpumps can give you easier installation and trouble-free performance. Write today for latest catalog.

Ingersoll-Rand
11 Broadway, New York 4, N. Y.

*OPERATES IN ANY POSITION

The I-R Motorpump gives you rapid, easy installation . . . they operate equally well in any position and require no baseplate or mounting arrangement. Discharge can be rotated to suit piping.

Ingersoll-Rand
MOTOR PUMP

9-851

For more facts circle 641 on Reader Service Card

Translucent Stran-Lite sheets give natural interior light in the F & H Supply Co. building, Pensacola, Florida.

Stran-Steel Buildings . . .

THE CUSTOM-BUILT LOOK OF QUALITY AT A VOLUME-PRODUCTION PRICE!

This handsome Rigid Frame building was designed and built exactly to F & H Supply Co. specifications. Yet the building was constructed entirely of Stran-Steel mass-produced components. Result: a custom-styled structure at volume production costs.

The building itself, used as a mill and industrial supply warehouse, is 80' x 120' including a 20' front section for offices and a display room. Nailable Stran-Steel joists were used to support the office ceiling and make a strong floor for additional storage space above. Longer, wider *Stran-Satin* wall sheets combined with translucent *Stran-Lite* make a smart exterior.

Completely Column-Free Interior

The column-free warehouse area has 100 percent usable space for storage, handling and loading facilities. A 6' dock with canopy runs 100' along the side of the building.

Stran-Steel Rigid Frame buildings can be tailored to the size, function and appearance you specify. Unobstructed interiors are ideal for factory, warehouse or retail outlet. You get a fire-safe building that goes up fast, is easy to insulate and heat, and needs little maintenance.

Five-year purchase plan calls for initial investment of only 25 percent. For more facts mail the coupon or call the Stran-Steel dealer listed in your Yellow Pages under *Steel Buildings* or *Buildings—Steel.*

A 20-ft. front section makes an attractive display room and office. Nailable steel joists in office ceiling support extra heavy storage above.

Dept. 28-18
STRAN-STEEL CORPORATION
Detroit 29, Michigan • Division of
NATIONAL STEEL CORPORATION

Stran-Steel Corporation, Dept. 28-18
Detroit 29, Michigan

Rush complete literature on industrial buildings.

Name_____

Title_____ Phone_____

Company_____

Address_____

City_____ Zone____ State____

For more facts circle 642 on Reader Service Card

A typical application of Toledo PRODUCTION SEATING utilizing Toledo Series 8130 Posture Chairs.

You can *shave costs* and *step up your output* with Toledo PRODUCTION SEATING!

Just *any* chair or stool won't do! When improperly seated, your employees are easy victims of fatigue and reduced efficiency. You pay the bill . . . in lost production, errors, sloppy workmanship, safety hazards.

More and more plants are curing production ills caused by improper seating the easy, economical TOLEDO way. Scientifically designed, Toledo PRODUCTION SEATING maintains *correct* body posture and helps keep employees fresh and alert. Their work improves in quality and quantity. They take fewer "time outs".

From Toledo's complete line you select the right chair for each operation . . . choose correct height, best seat adjustment, whether seat shall swivel, footrests, if needed, type of foot required. Heavy-duty Toledo construction virtually eliminates chair maintenance and repair costs.

For full facts about Toledo PRODUCTION SEATING, write to us, or wire collect. No obligation.

FREE!

SEATING ANALYSIS CHART

Send for your copy now. No obligation. Use it to determine status of seating in your plant operations . . . pinpoint areas where improper seating is costing you money.

Fixed Height Posture Chair — QUICK Adjustable Posture Chair

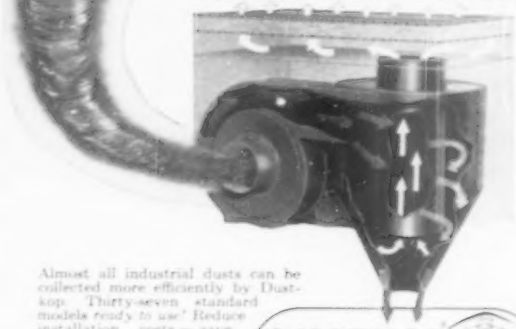
Shown here are two of many models to choose in Toledo's complete line of QUICK Adjustable, Adjustable and Fixed Height posture chairs.
10 basic seat heights, range 14" to 32".

The Toledo Metal Furniture Company
1306 SOUTH HASTINGS STREET, TOLEDO 7, OHIO

For more facts circle 643 on Reader Service Card

CYCLONE SEPARATION

FOR MORE EFFICIENT DUST COLLECTION —FILTERS LAST LONGER



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models *ready to use!* Reduce installation costs — save space. Write for descriptive literature.

DUSTKOP STOPS DUST

ALSO A COMPLETE LINE OF MIST COLLECTORS

AGET MANUFACTURING COMPANY
1410 EAST CHURCH ST., ADRIAN, MICH.

For more facts circle 644 on Reader Service Card

THIS FLOOR IS *Corrosion-proof*

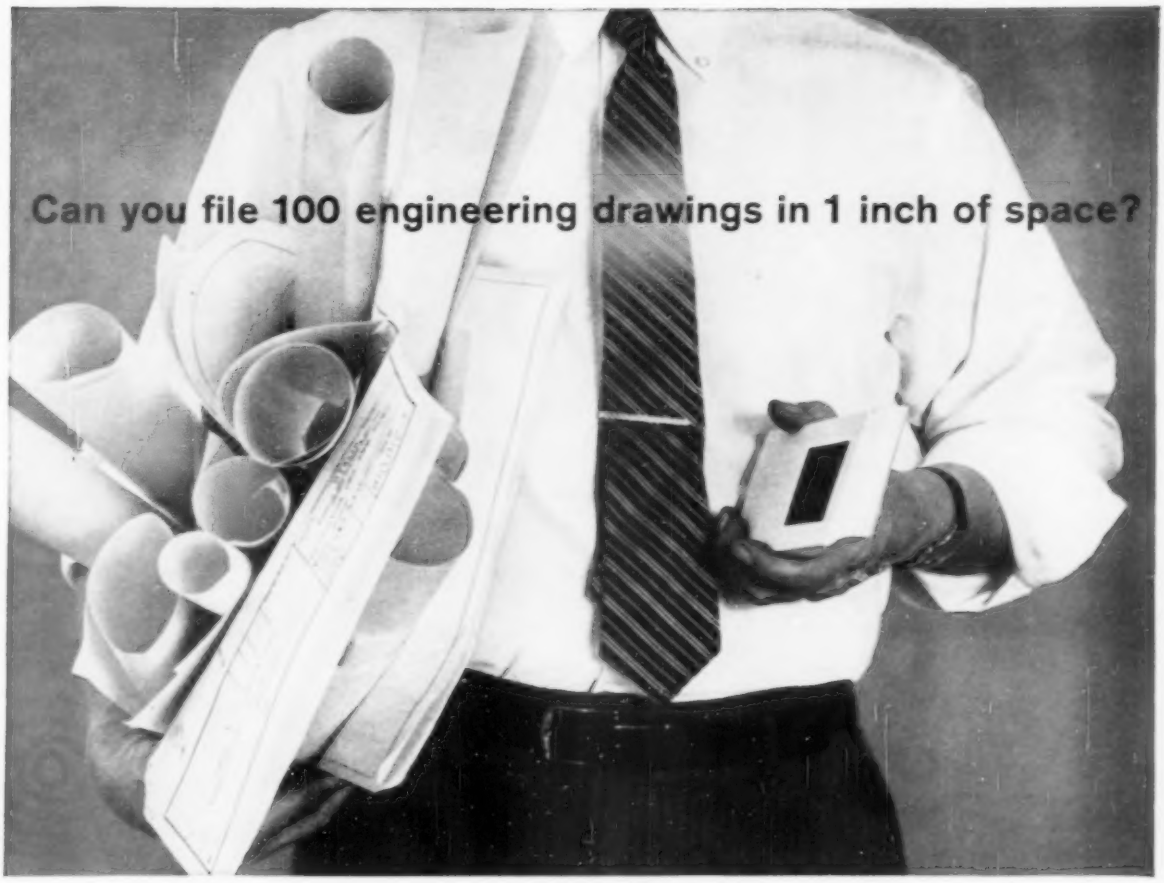
SAUEREISEN No. 40

was used in laying this floor at a major brewing plant. Bottling alkalis and food acids resulting from processing have no effect on such a floor, because it is water-proof, and easily kept clean. Sauereisen No. 40 is a quick-setting, self-hardening resin base cement providing a mortar that can be troweled, so that floors are lastingly corrosion-resistant.

40 A *Tell us your floor problems! Write for catalog.*

Sauereisen Cements Co., Pittsburgh 15, Pa.

For more facts circle 645 on Reader Service Card



Now you can . . . with Microline® Service

New nationwide microfilm centers eliminate bulky print files for you!

When record filing and finding get out of hand—get in touch with MICROLINE. Microline has established Service Centers throughout the country, manned by experts in the microfilm field . . . men who are trained to help you set up the Microline unitized card file system best suited for your operation.

New Microline Service streamlines engineering drawing files by a quick, simple, inexpensive conversion to a Filmsort microfilm card file system. No more double filing . . . now, each card is *both* index *and* record. You get prints quickly and inexpensively, any size you want, and save up to 95% in space requirements . . . free valuable filing space for more productive uses. With microfilm copies in your active file, you can store your valuable originals away, safe from the wear and tear from constant usage. What's more, your drawings are *immediately available* for use by *any department* in your organization.

Simply mail the coupon below for the name and location of your local Service Center. You will also receive, without obligation, the Microline booklet giving you the complete story, and containing a special free offer which will dramatically demonstrate what this advanced new system can do for you.

microline

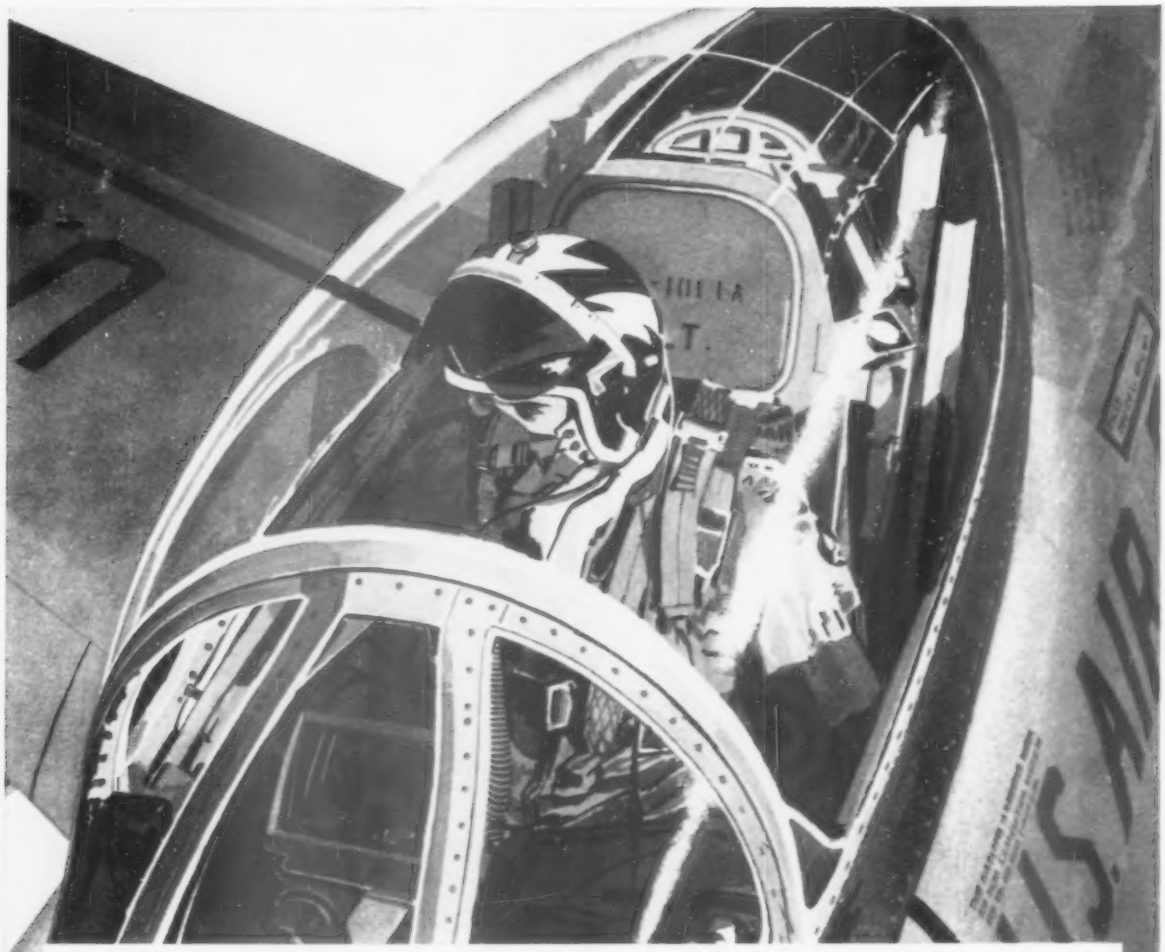
Microline Products Group, Ozalid Division of General Aniline & Film Corp.
Microline in Canada, The Hughes-Owens Company, Limited, Montreal

MICROLINE DIVISION OF OZALID
DEPT. N-6, JOHNSON CITY, N. Y.

Please send me the name and location of my local Microline Service Center. Also, the booklet giving the complete Microline story and containing a free demonstration offer.

Name_____
(please print)
Firm_____
Position_____
Address_____
City_____ State_____

For more facts circle 646 on Reader Service Card



This "bubble" owes its complexion to Polyken® tape

NOT A SCRATCH . . . NOT A DENT . . . THANKS TO THE MODERN METHOD OF SURFACE PROTECTION

The cockpit canopy of a fighter plane can be easily scratched during manufacture. So makers of supersonic aircraft take no chances. They protect its relatively "soft" surface with pressure-sensitive tape.

Not just *any* tape, though. Canopies are too valuable for that. Throughout handling and storage, they're covered with special Polyken tape.

Whatever surfaces you want to protect (from soft plastic to tough steel), there's a Polyken tape that unwinds easier, conforms better, gives superior surface protection, and pulls off clean.

THE MODERN TOOL . . . AT WORK FOR MODERN INDUSTRY

For advice on your surface-protection problem —check with the Polyken Industrial Tape Distributor nearest you, or write to the Polyken Sales Division, 309 W. Jackson Blvd., Chicago 6, Illinois. Dept. FMM-6

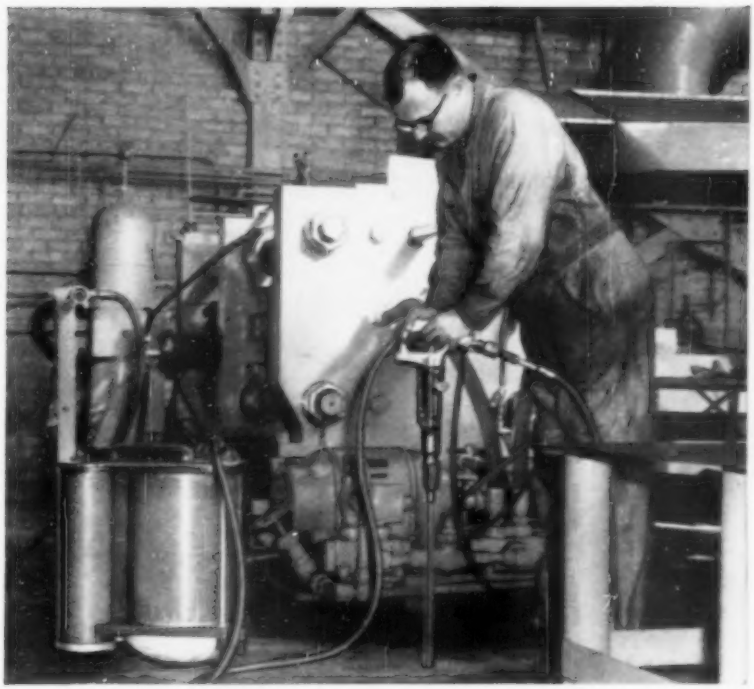
Polyken

INDUSTRIAL TAPES

THE KENDALL COMPANY
Polyken Sales Division

THOR DUSTLESS

THE PROBLEM—Here is familiar scene in which air hammer creates dust and sprays cuttings of concrete or brick clay on indoor jobs. These cuttings and objectionable dust lower efficiency. Thor eliminates such conditions by reversing the blowing action to suck dust and cuttings through special hollow drill steel to filtered receptacles.



THE SOLUTION—Thor's new 15DL Utility Drill weighing only 14 lbs. is seen drilling at the same rate as drill at left, yet evidences a completely dustless atmosphere. New system "inhales" dust and small cuttings- leaves no mess as in wet drilling.

AIR HAMMERS

Thor takes another of its famous giant steps forward—this time eliminating the biggest operation nuisance of star drilling in concrete . . . dust and flying chips!

A powerful air siphoning action sucks dust and chips thru the back head, into dust-extracting cylinders. This insures a safer, cleaner, healthier atmosphere for indoor operations involving concrete, brick, stone and other masonry materials. Your Thor distributor will give you a convincing demonstration. Thor Power Tool Company, Prudential Plaza, Chicago 1, Illinois.

Thor PORTABLE POWER TOOLS

THOR POWER TOOL COMPANY, CHICAGO

Branches in all principal cities

For more facts circle 648 on Reader Service Card

Accidents cost more than

ALCOA ABRASIVE TREAD PLATE

An employee slips on a greasy floor and twists his knee. A severe, chronic inflammatory condition results. Medical costs and Workmen's Compensation total $10,553.77. The employer's accident rate is up. Production time is lost while a new man is trained.

This is just one of 20,000 avoidable slipping accidents in industry every year. Alcoa® Aluminum Abrasive Tread Plate with lasting slip-proof qualities prevents such accidents. Tough particles of fused aluminum oxide in its abrasive surface stay slip-proof even when wet, oily or greasy. It is the only nonskid floor surface that gives you the advantages of corrosion resistance and light weight.

Learn how you can eliminate hazardous conditions on floors, stairs, ramps and other areas. Check the coupon below; write Aluminum Company of America, or call your nearest Alcoa distributor.

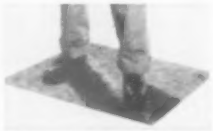
Make Your Own 30-Second Safety Test . . . Check the Coupon for FREE Sample of Alcoa Aluminum Abrasive Tread Plate.

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

"ALCOA THEATRE"

Exciting Adventure, American Movies Exercises



Alcoa Abrasive Tread Plate gives a safe, sure grip—even when wet, oily or greasy.

Aluminum Company of America
1081r Alcoa Building
Pittsburgh 19, Pennsylvania

I'd like to see how Alcoa Abrasive Tread Plate prevents slipping. Please send me FREE sample—also application, design and fabricating data.

Name and Title_____
Company_____
Address_____
City and State_____

For more facts circle 649 on Reader Service Card

Put the POWER PUNCH back in your Black & Decker tools

with GENUINE FACTORY BRANCH SERVICE

★ Free Tool Inspection
★ Standard B&D Guarantee

Look under "Tools-Electric" in Yellow Pages for address of your nearest FACTORY SERVICE BRANCH. Or write direct for address of nearest branch to:

THE BLACK & DECKER MFG. CO., Dept. S1606, Towson 4, Md.

B&D Black & Decker®
QUALITY ELECTRIC TOOLS

For more facts circle 650 on Reader Service Card

MOUSETRAP, STEAM TRAP, SEWER TRAP

. . . it makes no difference

. . . the world *won't* beat a path to the door of the man who builds a better one *and then doesn't advertise it* so that people will know about his product, know where it can be bought and how much it costs.

Advertising benefits the buyer, too. It tells you the product story, makes it easy for you to buy. Even more important to you, advertising leads to mass production and volume sales . . . which means lower costs and lower prices.

Yes, "Advertising Benefits You" . . . 'specially businesspaper advertising.

YES ADVERTISING BENEFITS YOU

A Johns-Manville Roof Survey helps to . . .

STOP COSTLY ROOF TROUBLES

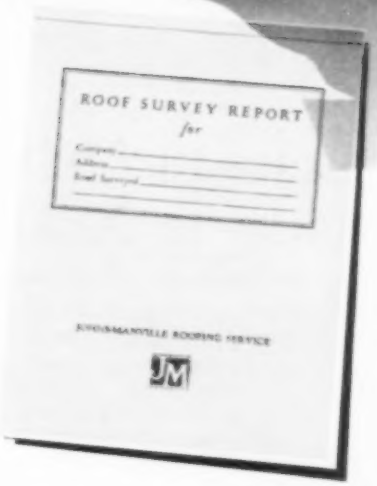
DON'T BE CAUGHT with costly roofing troubles. Even though your roof never has leaked, there may be defects you haven't noticed.

To spot possible trouble, it pays to have your roof inspected by an expert every year or so. And, your J-M Roofing Contractor is the man to do it.

His inspection will cover not only the main roofing areas, but also the flashings, parapet walls, skylights, drains, pent-houses . . . everything on your roof that has a bearing on its ability to keep out the weather.

For a free Roof Survey, call your J-M Roofing Contractor. He is listed in the Classified Telephone Directory.

For further information about what may be happening to your buildings, send for the 40-page booklet, "Things You Should Know About Your Roof." Write to: Johns-Manville, Box 158, New York 16, N.Y. In Canada, write: Port Credit, Ontario.



The J-M Roof Survey is made without obligation. A written report will tell you what defects are found, what you should do and how you can do it.

JOHNS-MANVILLE

For more facts circle 651 on Reader Service Card

SAVINGS IN INITIAL BUILDING COSTS

(per 100 sq. ft. of storage space eliminated)

% floor space saved by ERECTOMATIC	Building cost per 100 sq. ft.								
	$700	800	900	1000	1100	1200	1300	1400	1500
5.....	$ 35	40	45	50	55	60	65	70	75
10.....	70	80	90	100	110	120	130	140	150
15.....	105	120	135	150	165	180	195	210	225
20.....	140	160	180	200	220	240	260	280	300

SAVINGS IN ANNUAL COST

(per 100 sq. ft. of storage area saved)

% floor space saved by ERECTOMATIC	Cost (per year) per 100 sq. ft.									
	$100	200	300	400	500	600	700	800	900	1000
5.....	$ 5	10	15	20	25	30	35	40	45	50
10.....	10	20	30	40	50	60	70	80	90	100
15.....	15	30	45	60	75	90	105	120	135	150
20.....	20	40	60	80	100	120	140	160	180	200

Typical savings in building costs and annual costs made possible with Hallowell ERECTOMATIC® quick-change shelf positioning and exclusive corner post construction, which permits full utilization of shelf width, are indicated in the above tables.

Hallowell *ERECTOMATIC* Steel Shelving saves up to 20% in cost of storage space

Ease of shelf adjustment and exclusive corner post construction mean these advantages:

- **better utilization of space**
- **full shelf use**
- **reduced floor space**
- **fewer shelving sections**

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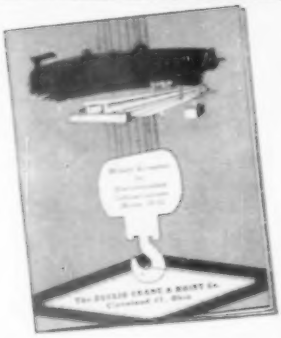

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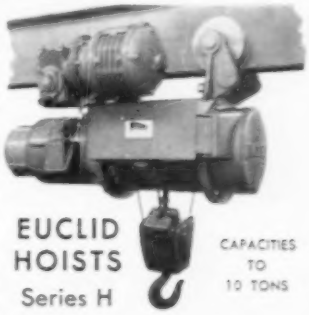

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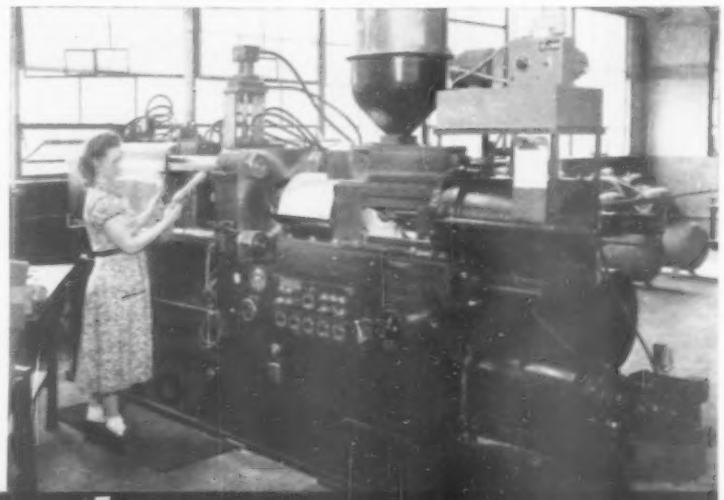

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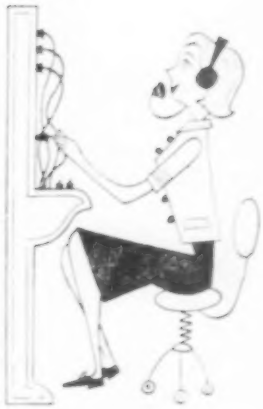

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3–Finishing Equipment
4–Coolant Cleaning Equipment
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66–Miniature Ball Bearings
67–Filter Frame
68–Foam Systems
69–Tooling Plastics
70–Two-Way Radio
71–Outdoor Lighting
72–Internal Telephone System
73–Demineralizers

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